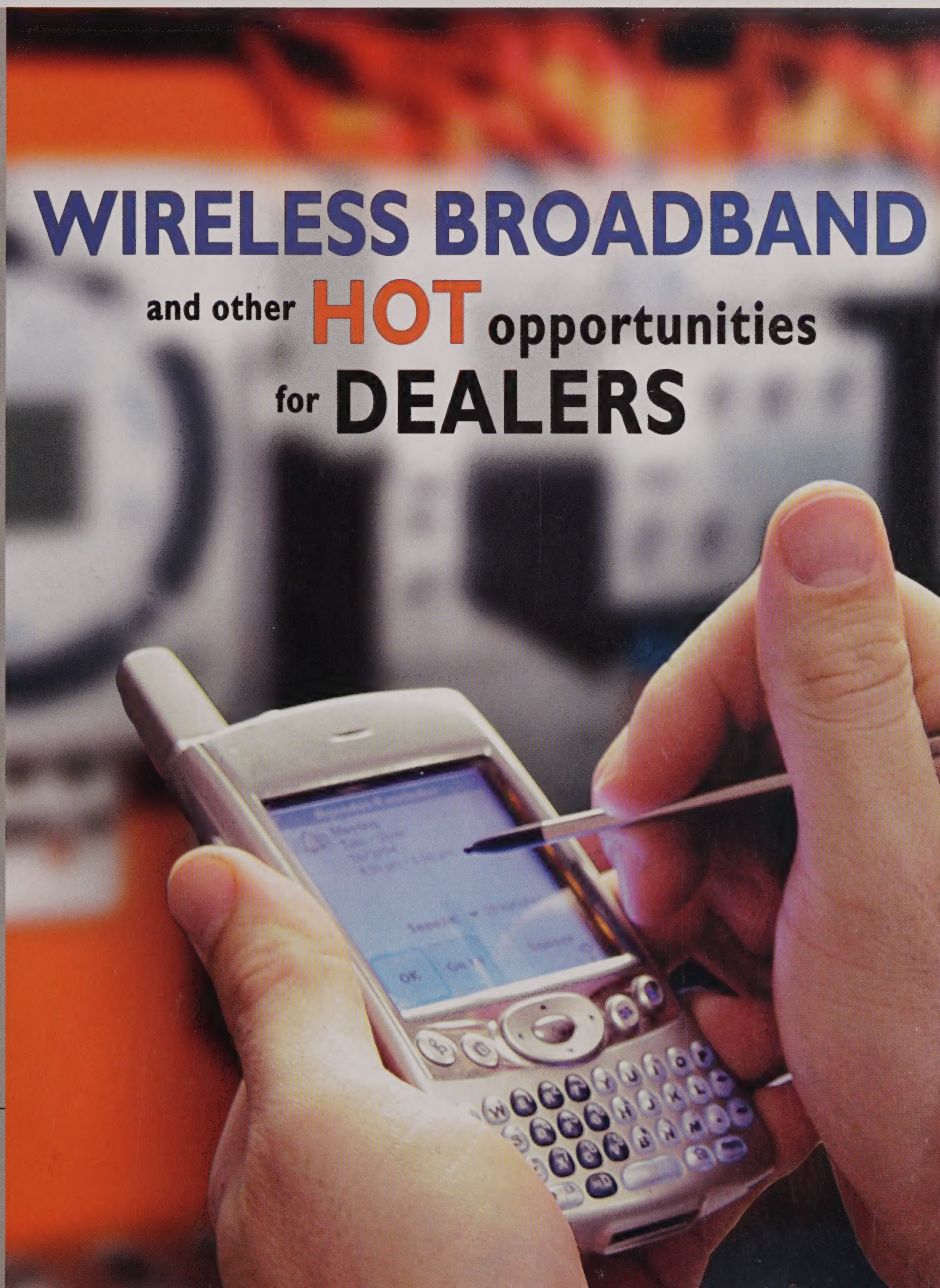
WIRELESS VOICE AND DATA FOR MOBILE AND REMOTE MISSION-CRITICAL OPERATIONS

RadioResource
MissionCritical™
COMMUNICATIONS

April 2005

WIRELESS BROADBAND
and other HOT opportunities for DEALERS



mccmag.com

The commercial vs. private networking debate continues **36**

Hot opportunities await dealers who know where to find them **62**

SDR: The future of communications is right around the corner **74**

Spectrum for public safety tops agendas in the United States and around the world **83**

E9-1-1 enters a new era driven by VoIP networking **90**

Project MESA promises a coordinated broadband strategy **102**

Please Route

- __ Comm. Manager
- __ IT Director
- __ RF Engineer
- __ Technical Officer

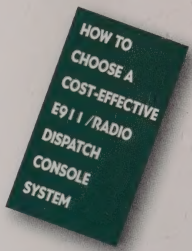
Play it smart. Don't be a moron. Compare vendors, features and costs with our free console comparison guide. Figure out which console system delivers the right features at the right price. Using this ingenious guide you'll find the console that delivers the most features for the least money is the UltraCom™ E911/Radio Dispatch console. This system is

Choose whether you want E911, radio dispatch and mapping all on a single or multiple monitors.

IF YOU DON'T COMPARE E911/RADIO DISPATCH CONSOLE FEATURES AND COSTS, PULL IN HERE.

Phase II compliant, providing interoperability, with E911, radio dispatch and mapping all in a single, easy to maintain, software application. E911 and radio dispatch can even be purchased as separate components. It's not just a collection of older systems but designed and built from the ground-up by us right here in the U.S.

Unlike our competitors who offer stripped down systems with loads of expensive add-on options, our system is complete. Even all our call data is buffered at each position eliminating the need for expensive redundant servers. Plus you save up to 50% in support costs with our state-of-the-art diagnostics. And all our software updates are always free for the life of the system – no software maintenance program is required.



FREE COMPARISON GUIDE

Compare different vendor's console features and costs with this new guide. It simplifies the complex selection process using a cross-comparison chart. You'll end up knowing exactly what you are paying for. See our website to order your guide: www.moducom.com

BUILT-IN AT NO EXTRA COST

- E911 and Radio Dispatch
- Radio & Phone Recall Recorders
- Logging Recorder
- Universal CAD Interface
- Free Software Upgrades
- User System Programming
- Interoperability & VoIP
- Automatic & Manual diagnostics
- User programmable screens
- Programmable Map Viewer
- Automatic Call Distribution (ACD)
- See our free demo for more

A new built-in feature, enhanced Interoperability and VoIP with our Distributed Network Architecture – which allows radio and phone to be shared among several dispatch center systems – will be available in the near future.

Pull into the smart lane. Call for your free comparison guide and look into the UltraCom Console System from a U.S. company with over 25 years of experience – the pioneer in all digital, programmable, consoles. Phone 800-845-0128 or to find out more see our website at www.moducom.com

MODUCOM

COST EFFECTIVE NOW. MORE COST EFFECTIVE OVER TIME.

MODULAR COMMUNICATIONS SYSTEMS, INC. 13309 SATICOY ST. NORTH HOLLYWOOD, CA 91605 · WWW.MODUCOM.COM

See Us at IWCE, Booth 14000 & 14002 CIRCLE #1

High Performance, High Speed Data and now...

High Power

Introducing the new High Power versions of the popular TM8000 series transceivers

VHF 50W / UHF 40W •
rugged MIL-SPEC construction •
IP54 protection against dust and water •
internal high speed data modem •
internal inversion scrambling •
internal AVL software support •
handset audio •
Windows™ programming •
10, 24 or 1500 channel models •
multiple RF power levels •
emergency stun/revive mode •
large options board space •
optional developers kit •

Tait - your complete communication systems provider, with TaitNet QS Simulcast, MPT 1327 trunked and P25 digital solutions for all your mobile voice and data requirements.

TM8250 Mobile Radio

TM8115 Mobile Radio

TM8110 Mobile Radio

TM8105 Data Radio

TAIT radio communications

us.taitworld.com

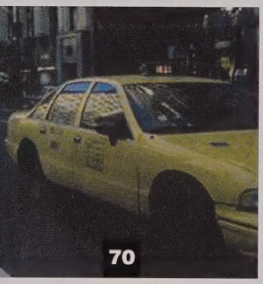
Tait North America Inc.
1-800-320-4037 USA
1-800-890-8248 CAN

CIRCLE #2

RadioResource
MissionCritical™
COMMUNICATIONS
April 2005
Vol. 20, No. 3

Private vs. Commercial Networks 36
This collection of articles presents various perspectives from commercial and private wireless players discussing which type of network is best for mission-critical operations. What they have to say might surprise you.

Hot Opportunities for Dealers 62
Shrinking margins on equipment sales and a decline in service revenues have battered the traditional two-way dealer in recent years. Read about five opportunities dealers can use to improve their business.
By Jeffrey Elliott



<< mobiledata >>

Hailing the Right Data Network 70
Taxi companies weigh the economic and technical trade-offs of public and private data networks. *By Graeme Harfman*

SDR: The Future of Communications 74
As wireless technology moves toward a high-speed data environment, it has adopted a number of trends from the IT world. Enter software-defined radio, which promises to usher in a new era of communications.
By Peter Clemons

DEPARTMENTS

Dispatch 8
Advice for dealers struggling with the data sale. *By Jeffrey Elliott*

Inside Washington 10
The FCC cracks down on construction notification. *By Ralph Haller*

800 MHz Rebanding 12
Know the rules governing interference protection. *By Klaus Bender*

News Briefs 20
An update from the world of wireless voice and data.

Public Safety News 28
Current events from the public safety sector.

What's New in Wireless LANs 112
Highlighting new and improved WLAN equipment.

Specs Survey: Mobile and Portable Radio Antennas 116
Product specifications for land mobile radio antennas. *By Steven Bromby*

New Products 123
The latest in voice and data offerings.

New Public Safety Products 126
Products and services for police, fire, and EMS.

Calendar 152
Industry events on the horizon.

Outlook 154
What constitutes harmful interference? *By Dale Hatfield*

Cover design by Brad Hamilton

READER SERVICES

Classifieds 129
Advertiser Index/Web Link 153
Product Inquiry Cards 155

RadioResource *MissionCritical Communications* (ISSN 1544-9556) (USPS 013-459) is published monthly, except bimonthly in January-February and November-December, free of charge to qualified recipients, by Pandata Corp., 7108 S. Alton Way, Building H, Centennial, CO 80112. This issue: April 2005, Volume 20, Number 3. Periodicals postage paid at Centennial, CO and additional mailing offices. ***POSTMASTER:*** Send address changes to ***RadioResource MissionCritical Communications***, P.O. Box 15637, N. Hollywood, CA 91615-9811. Canadian Post Publications Mail Agreement No. # 40065056. Canadian Return Address : DP Global Mail, 4960-2 Walker Road, Windsor, ON N9A 6J3.

How to contact us

Editorial	Sales	Subscriptions
edit@radioresourcemag.com	info@radioresourcemag.com	lfriday@radioresourcemag.com
Phone: 303-792-2390 ext. 20	Phone: 303-792-2390 ext. 10	Phone: 303-792-2390 ext. 15
Fax: 303-792-2391	Fax: 303-792-2391	Fax: 303-792-2391

Visit our Web site at **www.mccmag.com**

Your Analog to Digital Conversion

Is Now Ready with Icom P25 Mobiles and Portables!

* FCC license pending. ©2005 Icom America Inc. • 425-454-8155 • The Icom logo is a registered trademark of Icom Inc. • 7169

DIGITAL RADIOS REQUIRED. IS YOUR AGENCY P25 READY?

For organizations who run an analog radio system and must migrate to a conventional P25 digital system, Icom provides one of the best solutions. The new F1721D series mobile and the new F70D series portable* allow you to program P25 digital and/or FM analog mode per channel. Flash ROM capability means future upgrades and flexible customization, tailored for your system. Moreover, built-in multiple tone signaling capability and an optional voice scrambler satisfy existing analog FM system requirements. Their wide range frequency coverage, rugged construction ensures a flexible, long life radio for you. Icom is the smart choice for current – and future – communication needs.

AMATEUR | AVIONICS | LAND MOBILE | MARINE | RECEIVERS | SYSTEMS

A VARIETY OF VERSIONS AND CONFIGURATIONS TO MEET YOUR NEEDS.

Each of these Icom radios comes in a full keypad or limited keypad version. A VHF or UHF version. Or a full P25, P25 upgradable, or conventional only version. Such flexibility gives your agency the tools it needs for an easy digital migration.

analog | digital

P25

For more information:

1.800.USA.ICOM
sales@icomamerica.com

www.icomamerica.com

ICOM

CIRCLE #3

RadioResource
MissionCritical™
COMMUNICATIONS
April 2005
Vol. 20, No. 3

PUBLIC SAFETY REPORT

Spectrum Opportunities in the United States and Around the World 83
Recent U.S. spectrum allocations for public safety in the 700 MHz and 4.9 GHz bands complement trends in spectrum management around the world. *By Bette Rinehart*

The Technology of Tomorrow 90
State and regional authorities, take heed. To choose the best E9-1-1 solution for your PSAPs, it is important to understand what the future holds for emergency communications technology. *By Guy Roe*

Have You Checked Your Noise Floor Recently? 96
Propagation software helps you define and check your radio system's link budget and target signal strength to achieve reliable coverage. *By Gary Hartman*

Project MESA 102
Project MESA is a public safety partnership established to coordinate and develop digital mobile broadband technology and improve the efficiency of first responders and rescue squads. *By Paul Reid*

A Dream in the Making 109
Arizona is one step closer to implementing a long-awaited statewide, interoperable radio system. *By Art Coughanour*

We make a difference

Vertex Standard offers the "New Standard" in any communication needs.
Try our products and See the Difference.

Vertex Standard US Headquarters
10900 Walker Street, Cypress,
CA 90630, U.S.A.
Contact us toll-free at **1-800-283-7839**
Extension 6600
vertexstandard@vxstdusa.com

Vertex Standard

http://www.vertexstandard.com

Survival of the Fittest

I love spring-cleaning. While my wife was busy dusting the living room baseboards, I disappeared into the basement to rotate our outdoor equipment.

For a few hours on a Saturday afternoon, I became the world's greatest outdoorsman. While stowing the skis and other winter apparatus and unpacking the camping and hiking gear, I daydreamed about all the wild adventures that we might face this season in the mountains of Colorado — perhaps getting stranded in a late spring snow squall or staring down a hungry mountain lion in our path.

In all honesty, our rugged outdoor activity this summer will probably come down to a few Sunday afternoon hikes with the dog. No matter, I like to be prepared. Thus, while thumbing through the popular *SAS Survival Handbook* to review a course of action if we found ourselves, say, sinking in quicksand (spread your body flat over the surface to distribute your weight), I came across an interesting bit of survival wisdom: "We are all used to surviving on our home ground ... but the true survivor must learn how to survive when taken from familiar surroundings or when those surroundings are drastically changed by man or nature," writes former British Special Air Service officer and *Handbook* author John Wiseman.

With increased competition and the negative effects of a soft economy, the two-way dealer business has changed significantly over the last few years, requiring many dealers to leave the familiar surroundings of two-way radio sales and service for new opportunities such as wireless broadband.

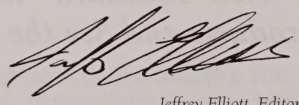
And the key to survival in this new environment is for dealers to revamp their sales and marketing practices to change the perception among their customers and in their community that they are simply a "two-way radio shop," according to Tim Duckworth, president of marketing strategy firm Opt-In Wireless.

His advice to dealers: Renovate your marketing strategy and position yourself as a total solutions provider. "They cannot rely on what they used to do for marketing." For example, the most successful dealers have integrated their marketing efforts with Internet-based functions such as e-mail and e-newsletters.

In addition, dealers need to expand their core competencies outside the world of RF. Selling wireless broadband, for example, requires a certain level of IT knowledge. "Hiring an IT salesperson who can talk the talk is a good idea if developing competencies from within is not practical," says business consultant and trainer Mark Landiak.

We value your opinions! Please e-mail your feedback to me at jelliott@radioresourcemag.com.

Dealers will find more tips like this as well as five hot opportunities for survival in the increasingly competitive wireless industry on page 62. Be sure to stop by booth 10035 at IWCE in Las Vegas to chat with us about the trends you're seeing in our industry.



Jeffrey Elliott, Editor

RadioResource MissionCritical COMMUNICATIONS

WIRELESS VOICE AND DATA FOR MOBILE AND REMOTE MISSION-CRITICAL OPERATI

RadioResource *MissionCritical Communications* delivers wireless voice and data solutions for mobile and remote mission-critic operations. The magazine targets public safety, state/local/federa government, transportation, field service, business and industrial users; engineering and consulting firms; mobile communication dealers/resellers; service providers and other industry profession in the United States and Canada. Editorial content includes busin and regulatory news, in-depth features, product information and comparisons, industry reports and trends, innovative applications emerging technologies, case studies and technical tips.

PUBLISHER/EDITORIAL DIRECTOR
Paulla A. Nelson-Shira, pnelson-shira@radioresourcemag.co

EDITOR
Jeffrey Elliott, jelliott@radioresourcemag.com

MANAGING EDITOR
Jennifer Chase, jchase@radioresourcemag.com

RESEARCH EDITOR
Steven Bromby, sbromby@radioresourcemag.com

ASSOCIATE EDITOR
Linda Mehlbach, lmehlbach@radioresourcemag.com

WEB SITE EDITOR
Lola Friday, lfriday@radioresourcemag.com

GRAPHIC DESIGNER
Brad Hamilton, bhamilton@radioresourcemag.com

EDITORIAL ADVISORY BOARD

Kerry Adams: President, Mobile Business Communications
Mark Crosby: President & CEO, ITA
Steve Crout: President, Triple C Communications
William Dean: Executive Director, Metro Radio Board
Mark Desautels: Vice President, Wireless Internet Development, C
Brent Finster: Telecommunications Manager, Contra Costa Regional Fire Communications Center
Joe Gallelli: President, The Gallelli Group Inc.
Stuart Goldstein: Detective, New York City Police Department
Ralph Haller: Consultant, Fox Ridge Communications
Joe Hanna: President, Directions
Dale Hatfield: Telecommunications Consultant
Craig Jorgensen: President, Quantum Telecommunications
Leonard Koehnen: Consulting Engineer
Bill Moroney: President & CEO, UTC
Steve Proctor: Executive Director, Utah Communications Agency Network
Harold Salters: Federal Regulatory Affairs, T-Mobile
Eric Schimmel: Telecommunications Consultant
Robert Schlieman: Radio Engineer, New York State Police
Alan Shark: Executive Director, Public Technologies
Tom Tolman: Manager of Communications Technology, NLECTC, Rocky Mountain Region

The opinions of the editorial advisory board members are their o and not those of their employers.

VICE PRESIDENT
Mark E. Shira, 1-800-548-5536, mshira@radioresourcemag.c

ACCOUNT EXECUTIVE
Jeff Peck, 1-800-548-5536, jpeck@radioresourcemag.com

CLASSIFIED ADVERTISING MANAGER
Terry Belair, 1-800-548-5536, tbelair@radioresourcemag.com

CIRCULATION MANAGER
Lola Friday, lfriday@radioresourcemag.com

PRODUCTION MANAGER
Annette Sova, asova@radioresourcemag.com

EXECUTIVE ASSISTANT
Melissa Richey, mrichey@radioresourcemag.com

ADMINISTRATIVE ASSISTANT
Sharon Knell, sknell@radioresourcemag.com

CORRESPONDENCE
Editorial & advertising correspondence should be addressed to
RadioResource MissionCritical Communications
7108 S. Alton Way, Building H, Centennial, CO 80112
Tel: 303-792-2390 Fax: 303-792-2391.
Editorial e-mail: edit@radioresourcemag.com
Advertising e-mail: info@radioresourcemag.com
© 2005 By Pandata Corp. All Rights Reserved.
Printed in U.S.A.

Pandata BPA WORLDWIDE

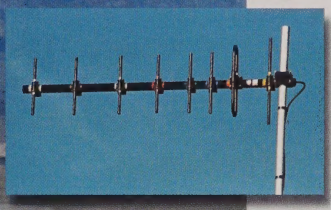
"COMING THROUGH LOUD AND CLEAR ..."

- Antennas
- Combiners
- Wattmeters
- Duplexers
- Filters
- System Design

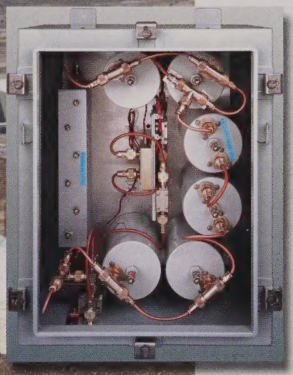
FORMER WACOM CUSTOMERS:

Telewave can support Wacom commercial and amateur products. Many Telewave products share a common design heritage with Wacom, and most of our cavity and isolator products are drop-in replacements for Wacom. We can repair, rebuild, and expand most existing Wacom items or systems without a complete change-out.

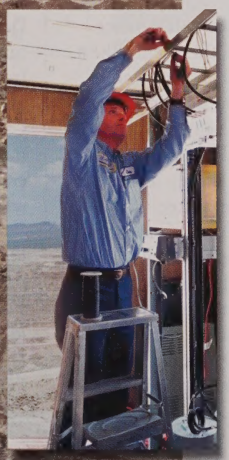
Telewave, Inc. delivers high performance ... everywhere, everytime.



We bring 33 years of product engineering and system design expertise to the table for every customer, large or small.



With a full line of standard products, and the ability to quickly create custom designs for special projects, Telewave provides unmatched support for Public Safety, Government, and Business radio systems.



Call us today at 1-800-331-3396 or +1 408-929-4400 and discuss your requirements with our expert sales engineers, or visit us at **www.telewave.com**

elewave, Inc.
660 Giguere Court
San Jose, CA 95133

Wacom is a registered trademark of Wacom Co., Ltd.

TELEWAVE, INC.®

Wireless Communications Manufacturers Since 1972

See Us at IWCE, Booth 3021 CIRCLE #3

FCC Cracks Down on Construction Notification

By Ralph Haller

The FCC announced plans to modify its Universal Licensing System (ULS) to expedite the termination of licenses when it has not received a notification of construction from the licensee. Most private radio licenses require construction of facilities within one year of the license grant date. The FCC rules also mandate that licensees notify the FCC that the stations were constructed in a timely manner. Failure to notify the FCC of construction can result in license termination, even if a station already has been constructed.

This is serious business. It can be a costly process to search for frequencies and get them licensed. The simple mistake of not notifying the FCC of construction can cause total loss of license, with no appeal rights. Under the new system, the ULS will generate a weekly public notice of licenses set for termination. The FCC will send the notice to the address of record for each licensee listed on the notice. Licensees will have 30 days from the date of the public notice to file a petition for reconsideration of the termination. Once the filing period has expired, the ULS will automatically terminate the license.

The new arrangement augments the system the FCC established in 2002. Since May of that year, the FCC has sent construction reminders to licensees 90 days prior to the required construction dates. Licensees have 15 days beyond the required construction date to notify the FCC of construction. Under the new system, if that notification is not received, the FCC will issue a public notice proposing license termination 30 days after the required construction date. For more information, see FCC DA 05-137, available on the FCC Web site, www.fcc.gov.

FCC Delays 700 MHz Narrowbanding Rules

The FCC has deferred the ban on marketing of equipment solely capable of utilizing 12.5-kilohertz bandwidth for voice communications in the 700 MHz public safety band from Dec. 31, 2006, to Dec. 31, 2014. The application deadline for new systems that operate only in the 12.5-kilohertz voice mode has also been extended to Dec. 31, 2014. The band will remain channelized in 6.25-kilohertz channels. The FCC encourages manufacturers to develop and begin marketing dual-mode equipment (6.25- and 12.5-kilohertz equivalent bandwidth) well before the 2014 deadline. The commission maintained its final migration date for 6.25-kilohertz equivalent equipment as Jan. 1, 2017.

Unlicensed Devices Use of TV Channels

Last year, the FCC proposed allowing unlicensed (Part 15) devices to use TV channels on a non-interference basis. At first blush, this seems like a very reasonable idea. Unlicensed devices can be made smart enough to listen on a channel before it begins transmitting. If a television signal is present, the device simply selects another channel that is free. The difficulty with the FCC's proposal is that land mobile stations share television channels 14-20 in 11 major markets.

Unlike television signals that are on the air continuously, land mobile signals are randomly on and off the air depending on channel dispatch use. In addition, each television channel is home to 80 12.5-kilohertz land mobile channels. Unlicensed devices would have to detect operation on all 80 land mobile channels in each TV channel. Due to the difficulty in detecting land mobile operations, the likelihood of interference to land mobile communications appears to be substantial.

The land mobile community has submitted comments to the FCC recommending that Part 15 devices not be allowed to share channels 14-20, eliminating potential interference. The FCC is currently considering its final decision in this matter. For more information, see ET Docket 04-186, available on the FCC Web site.

800 MHz Rebanding

The 800 MHz rebanding proceeding has certainly been one of the most controversial the FCC has handled in the past several years. In a recent decision, the commission adopted a little-noticed provision that cuts the certified frequency coordinators out of the rebanding process. Section 90.175 of the FCC rules was modified to exempt applications filed pursuant to the rebanding process from coordination by a certified frequency coordinator. (See FCC 04-294, WT Docket 02-55.) Presumably, the commission's assumption was that the transition administrator would also act as the frequency coordinator. Given the unique characteristics of many of the public systems in the country, it remains to be seen whether this was a good decision. ■

Ralph Haller served as chief of the FCC's Private Radio Bureau for more than eight years. He is currently president of Fox Ridge Communications in Gettysburg, Pa. Contact him at rhaller@frci.com or 717-334-7991.

PUBLIC SAFETY:
POLICE / FIRE
EMS / AMBULANCE
EOC / DISASTER MANAGEMENT CENTERS
GOVERNMENT

TRANSPORTATION:
AVIATION
MASS TRANSIT
MARITIME
RAILWAYS

UTILITIES:
ENERGY
FRESH / WASTE WATER
OIL / GAS
ELECTRIC

FACILITIES SAFETY + SECURITY:
HEALTHCARE
CORPORATE / COLLEGE CAMPUSES
CASINOS
HOTELS / RESORTS

Introducing Zetron's Newest Member . . .

Integrator Map

NEW FROM THE LEADER IN MISSION-CRITICAL COMMUNICATION SOLUTIONS

Integrator Map is Zetron's newest member of the Integrator Suite of applications. This Mapped ALI tool allows PSAPs to quickly and dynamically locate, display and manage incoming 9-1-1 calls. Integrator Map is full-featured, providing the user with a wide range of display tools and layers. Through the use of a dynamic API, Integrator Map can be seamlessly integrated with Integrator 9-1-1 allowing calls to be answered directly from the map. Integrator Map is Phase I and II ready and works with both ESRI and MapInfo platforms.

For a demonstration of this powerful tool, contact Zetron at ***425.820.6363***

Integrator Map FEATURES:

- *Automatically displays wireline and wireless calls and can track moving callers*
- *Provides the ability to answer and release calls from the map*
- *Autosend feature allows for automatic faxing, emailing and remote printing of map views to agencies*
- *Supports multiple map views in a single interface*
- *Ability to link an address to a file, e.g., images, floor plans, SOPs*

Wireline

Wireless Phase I & II

Integrator 9-1-1 & Map

Integrator SUITE

ZETRON®
MISSION-CRITICAL COMMUNICATION SYSTEMS

United States: 1 425 820 6363 | United Kingdom: 44 (0) 1256 880663 | Australia: 61 7 3856 4888 | WWW.ZETRON.COM

See Us at IWCE CIRCLE #6

Considerations for Future Interference Protection

By Klaus Bender

The FCC's rulemaking "Improving Public Safety Communications in the 800 MHz Band" has been one of the most complex issues the commission has ever addressed. During the next three-and-a-half years, the 800 MHz band will be segregated by architecture: the lower portion reserved for site-based, noise-limited systems and the upper portion allocated for low-site, interference-limited, cellular architecture systems such as those operated by commercial carriers.

In the process, Nextel and other enhanced SMR (ESMR) operators will vacate channels below 862 MHz. Most of the licensees that currently occupy the channels between 851-854 MHz will move to channels vacated by Nextel and others to allow all public safety systems in the 866-869 MHz band to move to 851-854 MHz. It is a process that will require thousands of FCC licenses to be changed and hundreds of thousands of radios to be replaced or retuned.

The FCC appointed a transition administrator (TA) to oversee this daunting task. The TA's responsibilities are massive. Ultimately, success or failure will be determined by how effectively the TA manages the process. Some licensees have already made deals to switch channels, hoping to start the process before Nextel and the TA become swamped with requests for assistance and information. Other licensees continue to believe that the FCC does not have the authority to force them to change channels, while still others are completely unaware of the entire proceeding.

For licensees operating 800 MHz systems, particularly those whose channels will be changed, the preparation for this effort involves a broad range of disciplines. Given the space provided, this article will concentrate on one aspect of the 800 MHz rulemaking: system coverage mapping.

Interference Defined

The FCC's 800 MHz rebanding order provides a definition of interference, a rarity in PLMR system rules. The rulemaking also establishes a benchmark for conditions when an existing licensee can receive protection from interference. So the question is: "Does your system measure up?"

The initial proposals for these rules set the interference protection standard at 20 dB carrier-to-interference plus noise (20 dB C/I+N), based on industry recommendations. Eventually, the FCC specified that "the public safety and other 800 MHz non-cellular signals will be entitled to protection only if the median power of the received signal is greater than or equal to -101 dBm (portables) or -104 dBm (mobiles) in the 806-816 MHz/851-861 MHz band segment." The FCC document continues, providing a relatively detailed technique for measuring the signal level of incumbent licensees and potential interferers.

The implications are clear. If a system does not meet the signal level requirements, the operator will not be entitled to protection from interference from other operators in the band, no matter how much the interference impacts public safety or critical infrastructure communications.

Managers of 800 MHz systems must decide whether to risk interference that could be costly to rectify or proactively analyze the situation. Discovering whether there is a problem, and the location of the problem, is the key to assessing the risk. If a system operator is aware of areas where coverage could be lacking, ignoring the problem until interference occurs places personnel and valuable resources at risk. This issue is the first reason system managers should consider mapping coverage of their systems to measure signal levels.

The Comparable System Requirement

When systems are changed in the rebanding process, the resulting system must be comparable to the original system. The criteria used to demonstrate system equivalency should be defined by contract and can be dependent on any number of factors. System administrators who have demonstrable coverage over desired areas, based on repeatable signal measurement techniques, can force consultants and manufacturers to meet the same coverage level when the system is changed.

Proactive signal measurement throughout an 800 MHz system offers licensees the opportunity to find coverage "holes" before interference results. For those entities that are reconfiguring their system, coverage data is a negotiation tool that will aid in making certain that the new channels are comparable.

The basic concept of measuring signal levels is straightforward: Log a location and a signal level and move on to the next location. While it is possible to collect the data manually, commercial wireless carriers have refined the process into a well-defined product called drive testing. These processes rarely are applied to PLMR systems; however, as discussed above, the need for this data is becoming more critical.

Drive testing is a three-step process. The

HUTTON® ...your wireless product experts

UTTON VERVIEW | MANAGE YOUR ACCOUNT | PRODUCT SEARCH | DESIGN A SYSTEM | SPECIFY INDUSTRY | MANUFACTURERS & SUPPLIERS | RESOURCE LIBRARY | NEWS & EVENTS

POLYPHASER

Don't Get Caught Without Protection!

AL-LSXM Hybrid Filter Technology

Capacitor coupled design provides superior RF performance and protection of equipment connected to coaxial cable.

Multi-Strike Capability

Fully Weatherized Housing

Low Throughput Energy

DC Block

2.0 - 6.0 GHz Freq. Range

PolyPhaser® CORPORATION

Hutton Communications, Inc.

U.S. Sales: 877-648-8866 • Canadian Sales 800-265-8685

www.huttononline.com

See Us at IWCE CIRCLE #7

first step requires mapping the area under review to define drive routes. A route should be indicative of the territory under consideration and could be as detailed as every road in a given county, for example. Route planning should include speed at which the vehicle will travel, traffic conditions, and time of day. It is often more convenient to plan the drive for late-night hours when traffic is minimal. Test transmitters can be temporarily installed using bucket trucks or cranes to simulate stations in the process of construction. Planning the drive routes generates the project plan for the entire effort.

The second step is the actual data collection. Frequently, teams of two perform this work, with one person driving the vehicle at a constant speed while a co-worker logs the data. It is possible for a mobile or portable radio to be used as the receiver to collect the data. A laptop computer with a GPS receiver and radio receiver connected to a specially equipped computer makes this function manageable.

Some manufacturers offer plug-and-play receiver cards that can be combined with other hardware to simultaneously collect signals from a variety of technologies or frequency bands. This presents opportunities for sharing costs of the data collection. If an agency contracts for a drive test of its 800 MHz system, the assembled team also could monitor coverage of a local utility's 800 MHz system, two cellular systems, a paging carrier, and several PCS carriers. The cost for the project could be shared, or the data could be sold as competitive

Prepare for Rebanding

Here are a few final suggestions on managing rebanding with respect to interference and comparable coverage.

1. Read the new FCC rules and understand the protection to which your system is entitled.
2. Become familiar with the measures needed to demonstrate harmful interference.
3. Obtain the local contact information for the commercial wireless providers in case interference does result.
4. If your agency is critical infrastructure or public safety, consider asking carriers in the area to notify you or your representative when they intend to activate a new base station.
5. Survey radio system users and find out where their system is underperforming.
6. Make attempts to measure signal levels in critical areas to ensure that the interference protection criteria are met.
7. Consider drive testing the entire area in partnership with other entities. — *K.B.*

A True Universal Charger?
Just Ask Me!
A TRUE UNIVERSAL CHARGER will charge all major radio manufacturers' batteries. If the radio utilizes all three chemistries, Nicd, Nimh or Lion, you will only need one adapter cup to accomplish charging the various battery chemistries. What makes the UC SERIES even more unique is that without any tools you can simply replace the adapter cups and the Charger will then charge another manufacturer's radio batteries. For additional information and pricing, please contact us:
Ronie
VP of Operations
TAIT
ICOM
VERTEX
MOTOROLA
KENWOOD
Universal Charger UC-1
Universal Charger UC-6
ISO 9001:2000
Made In U.S.A.
W&W MANUFACTURING CO.
TOLL FREE: 800-221-0732 • Email: email@ww-manufacturing.com • Website: www.ww-manufacturing.com
See Us at IWCE, Booth 7055 CIRCLE #8

Already working for you.

Workers at the Panama Canal rely on Avtec. Our consoles coordinate ships as they transit through the canal, destined for ports in America and all over the world.

Major industries count on Avtec to bring you the products and services you depend on every day—from railroads to airlines, utilities and emergency services, to the United States Air Force Air Defense Command.

We've been making consoles—only consoles—for over 20 years. To learn more about our DSPatch family of products, visit our Web site or contact us at 1-800-310-7045 or sales@avtecinc.com.

www.avtecinc.com

PRODUCT OVERVIEW

DSPatch
Scalable capacity/32–2,048 ports
Up to 128 operator positions
High availability (.99995)
MTBF > 90,000 hours
Integrated radio/telephone

DSPatch32
A smaller, more affordable configuration of DSPatch

DSPatchNET
All features of DSPatch, plus:
Free seating
Up to 512 operator positions
Advanced SNMP network monitoring & alarms
VoIP (Voice over Internet Protocol)
Business continuity solutions

AVTEC

consoles you can count on

See Us at IWCE CIRCLE #9

TESSCO delivers tomorrow's wireless technology today.

Two-Way Radio Security
- Remote Monitoring
- Sensor Event Notification

Wireless Video Surveillance
- Remote Monitoring
- Remote Coverage

If it's in *Mission Critical*, chances are TESSCO delivers it.

Founded in traditional two-way, TESSCO led the way into cellular technology, supplying the buildout of the nation's first cellular system. Today, TESSCO is the only supplier of everything from two-way to the latest wireless broadband, mobile data and asset-tracking technologies—over 34,000 wireless products from 450 manufacturers.

TESSCO has always been there first. And we'll be out front tomorrow.

Your Total Source
TESSCO
Everything For Wireless

See us at

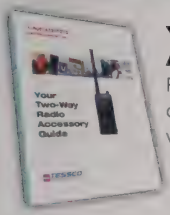
IWCE

Booth 9013

Accessories
- Two-Way, Nextel and Cellular Accessories

Wireless Networking Solutions
- Lease Line Replacement
- Line-of-Sight; True-Non-Line-of-Sight
- Last Mile Connectivity
- WLAN

Mobile Data & Asset Tracking
- In-Vehicle Computers, Mounts and Installation Supplies
- Vehicle and Asset Tracking Solutions



Your Two-Way Radio Accessory Guide
Request a copy or download now at www.tessco.com/go/2way

1-888-256-9220
www.tessco.com/go/2way

CIRCLE #10

information to firms that specialize in wireless carrier analysis.

The third and final step is to "post-process" the data into a format useful for analysis. If cellular and PCS information is collected, the data can be formatted to carrier standards. Regularly, a report is provided that maps signal levels with locations. Supporting data is stored in a spreadsheet or database for later scrutiny. The report should detail measurement methodology so the measurements can be repeated at a later time if necessary. The ability to repeat the process is key to using the report when negotiating for system rebanding.

Each location has one or more radio signal levels associated with it. This allows for countless variations in analysis, including averaging signal levels within a grid in order to determine an average signal level per unit area. When combined with a detailed measurement methodology and calibrated equipment, this data will set a baseline for negotiations with manufacturers involved in rebanding.

Have a Plan

Every operator of equipment in the 800 MHz band should have a plan related to the rebanding, regardless of whether or not your equipment is being changed. The overall plan for ongoing operation in this band is complex and involves legal, engineering, operations, and administrative resources.

Rebanding of the 800 MHz band forces licensees to assign value to their systems, understand their inventory of radios and the warranties associated with those radios, and evaluate areas where coverage or equipment needs improvement. A fully prepared system manager understands the company's rights to protection from interference.

The 800 MHz rebanding matter is complex. Organizations that must undergo rebanding are rarely equipped to handle the entire process internally. Trade associations, law firms, equipment vendors, and consulting firms are available to assist in the necessary negotiations, planning, and implementation.

In the end, the only way to handle all the issues is to divide the problem into parts and then work on the parts individually. Interference protection and comparable coverage for systems that need to move is one of the most important parts of the rebanding process. ■

Klaus Bender is vice president of engineering for SiteSafe, a company that provides a variety of database, wireless engineering, and regulatory services to the land mobile community. He is a registered professional engineer in the state of Virginia. Contact him at klaus@sitesafe.com.

COMMUNICATION + TEAMWORK = SUCCESS

Make Dynamic Instruments'
Digital Voice Recorders
a part of your communication team today!

DYNAMIC INSTRUMENTS

800.793.3358
www.dynamicinst.com

See Us at IWCE, Booth 1026 CIRCLE #12

KENWOOD

Listen to the Future

THE NEXT GENERATION

New for IWCE 2005...The latest in P25 technology along with new innovative products from Kenwood

Visit us at Booth #1001

1-800-950-5005

www.kenwood.net

ADS#04605

CIRCLE #13

BUSINESS

Wireless Data Solutions, IDA Corp. to Merge

The boards of Wireless Data Solutions (WDS) and IDA Corp. signed an agreement for the two companies to merge. The transaction is expected to be finalized by the end of this month. WDS, based in San Diego, manufactures and sells GPS-equipped MDTs through its Dinet subsidiary.

IDA, based in Fargo, N.D., is the manufacturer of Trakit, a global tracking data system that captures information relating to automatic GPS tracking. Together, the two companies plan to provide VoIP equipment, digital remote-control devices for two-way radio base station equipment, and fleet MDT products with GPS and proprietary software. IDA President and CEO Reed Danuser and WDS Executive Vice President Robert Chase will head up the new operation.

Alvarion to Launch WiMAX Product in 2006

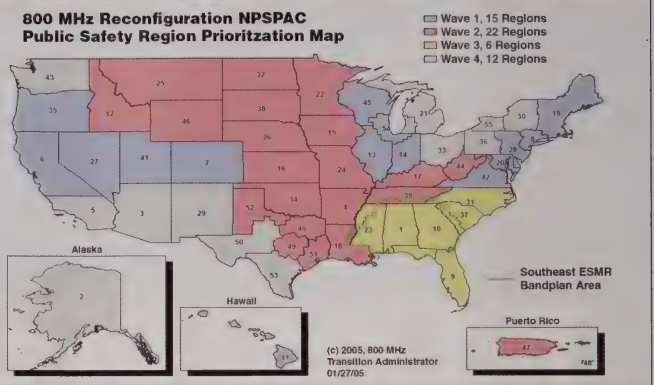
Alvarion developed a mobile broadband data solution based on the 802.16e WiMAX standard. The company plans a product launch in 2006 to coincide with the pending availability of WiMAX-enabled chips in devices such as laptops and PDAs. Alvarion expects to begin testing its 802.16e broadband networking equipment within the year.

Wireless Age to Acquire mmwave

Wireless Age Communications will acquire mmwave Technologies, a distributor of wireless and microwave components, test systems, and subsystems. Details of the transaction were not released. Brad Poulos, president of mmwave, will hold the same position in the combined entity.

Aeroflex Drops Racal Brand Name

Aeroflex changed the name of its Racal Instruments Wireless Solutions division, which it acquired from Racal Instruments Group Holdings in July 2003, to Aeroflex. "Our goal is to grow through product sales and acquisitions to become one of the top test and microelectronic companies in the world," said Len Borow, Aeroflex vice chairman and COO. "To help achieve this goal, it is important to have a single Aeroflex brand recognized worldwide."



And They're Off ...

TA issues 800 MHz rebanding schedule, while Nextel formally accepts FCC order.

The 800 MHz rebanding process now has a schedule with the Transition Administrator's (TA's) release of the regional rebanding plan that splits the United States into four waves (see figure). The plan, which staggers negotiation and reconfiguration dates, is designed to facilitate rebanding throughout the entire country within 30 months of the start date.

Licensee negotiations with Nextel officially will commence on June 27 with channels 1-120 in the first wave. Reconfiguration will begin in the fourth quarter, with overlapping periods for negotiation and reconfiguration of National Public Safety Planning Advisory Committee (NPSPAC) channels. Wave 2 starts its negotiation period in the fourth quarter; Wave 3 in Quarter 1, 2006; and Wave 4 in Quarter 2, 2006. The reconfiguration plan places most border regions in Wave 4 as the United States government continues its attempts to revise treaties governing the 800 MHz band with Canada and Mexico.

"Nextel stands shoulder to shoulder with public safety and the FCC and accepts the responsibilities, obligations, license modifications, and conditions specified in the FCC's Report and Order in WT Docket 02-55, "Improving Public Safety Communications in the 800 MHz Band ...," stated Tim Donahue, president and CEO of Nextel Communications, in a recent letter to the FCC.

Meanwhile, the law firm of Brown Nietert & Kaufman filed a request for partial stay of the order on behalf of two clients. The stay asks the FCC to remove BearingPoint from the TA team due to its prior consulting relationship with Nextel. More information on engineering considerations with the 800 MHz rebanding process is available in the "800 MHz Rebanding" column on page 12.

InnerWireless, SmartLink Secure Funding

In-building wireless solutions provider InnerWireless received $11 million in Series C funding from existing investors. The company will appropriate the money for expansion into healthcare and government markets. Participants in the funding included Johnson Controls, Sevin

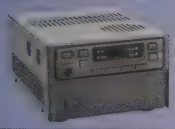
ASTRON 9 Autry Irvine, CA 92618
(949) 458-7277 • (949) 458-0826

www.astroncorp.com

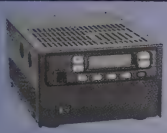
...POWER ON WITH ASTRON

SWITCHING POWER SUPPLIES...

E151765 E151765



MODEL SS-10TK



MODEL SS-12IF

SPECIAL FEATURES:

- HIGH EFFICIENCY SWITCHING TECHNOLOGY SPECIFICALLY FILTERED FOR USE WITH COMMUNICATIONS EQUIPMENT, FOR ALL FREQUENCIES INCLUDING HF
- HEAVY DUTY DESIGN
- LOW PROFILE, LIGHT WEIGHT PACKAGE
- EMI FILTER
- MEETS FCC CLASS B

PROTECTION FEATURES:

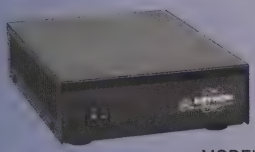
- CURRENT LIMITING
- OVERVOLTAGE PROTECTION
- FUSE PROTECTION.
- OVER TEMPERATURE SHUTDOWN

SPECIFICATIONS:

INPUT VOLTAGE: 115 VAC 50/60HZ
OR 220 VAC 50/60HZ
SWITCH SELECTABLE

OUTPUT VOLTAGE: 13.8VDC

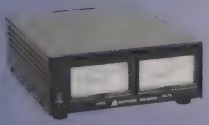
AVAILABLE WITH THE FOLLOWING APPROVALS: UL, CUL, CE, TUV.



MODEL SS-18

DESKTOP SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅜ x 6 x 9	3.4
SS-18	15	18	1⅜ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅛	4.2
SS-30	25	30	3¾ x 7 x 9⅛	5.0



MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅛	4.2
SS-30M*	25	30	3¾ x 7 x 9⅛	5.0

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-10	7	10	3½ x 19 x 9⅛	4.3
SRM-12	10	12	3½ x 19 x 9⅛	4.7
SRM-18	15	18	3½ x 19 x 9⅛	5.0
SRM-25	20	25	3½ x 19 x 9⅛	6.5
SRM-30	25	30	3½ x 19 x 9⅛	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅛	6.5
SRM-30M	25	30	3½ x 19 x 9⅛	7.0

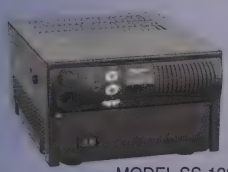
MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅛	10.5
SRM-30-2	25	30	3½ x 19 x 9⅛	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅛	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅛	11.0



MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

EF JOHNSON AVENGER GX-MC41
EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

NEW SWITCHING MODELS

SS-10GX, SS-12GX
SS-18GX
SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

Rosen Funds, Rho Ventures, Massey Burch Capital Corp., Technology Associates Management Co., and Genesis Campus.

SmartLink Radio Networks announced the closing of $15 million in Series B financing led by Waltham, Mass.-based Key Venture Partners, with participation from existing investors General Catalyst Partners and Highland Capital Partners. SmartLink CEO Tom Lambalot said the company will use the financing to expand its development and marketing efforts around its software-defined radio (SDRR) network equipment.

PEOPLE

Velociti Appoints New COO

Mobile technology installation and deployment firm Velociti promoted Deryk Powell to COO where he assumes responsibility for growing the business through diversification and strategic partnerships. Powell had been vice president of the company, which cross-trains its employees in transportation and wireless technology implementations in the United States, Canada, Mexico, Puerto Rico, and Western Europe.

Motorola's Zafirovski Departs

Motorola president and COO Mike Zafirovski resigned from the company in January. "This is a decision I have considered carefully and which I discussed at length with [CEO Ed Zander]," Zafirovski said. "This is the right time for me to start considering other opportunities." The move was widely expected after Zafirovski was passed over for the CEO position vacated by Chris Galvin and awarded to Zander, formerly of Sun Microsystems.

REGULATORY

FCC Chairman Steps Down

FCC Chairman Michael Powell departed the FCC as a commissioner and chairman in March. "Having completed a bold and aggressive agenda, it is time for me to pursue other opportunities and let someone else take the reins of the agency," Powell said in a statement.

Bush Issues Spectrum Policy Memo

In January, President Bush directed heads of executive departments and agencies to implement recommendations on future spectrum policy initiatives outlined by the Department of Commerce in two reports released June 2004. The memorandum requires impacted agencies to provide agency-specific strategic plans to the Secretary of Commerce by December 2005 regarding spectrum requirements such as bandwidth and frequency location for future technologies and services.

A CRITICAL CALL
IS NO TIME TO HAVE
SOMETHING GO WRONG
WITH YOUR RADIO
TRANSMISSIO
A home address, a license plate number, a life. By using an unreliable antenna, you risk losing any one of these. Which is why we've taken our experience in covert and applied it to public safety and tactical antennas. As always, each of our new antennas was developed with your input — to meet your needs. To find out how we can help you communicate clearly, every time, call 866.307.8426 or visit sti-co.com.
sti-co
coming through.
See Us at IWCE CIRCLE #15

ANY FREQUENCY... ANY TECHNOLOGY...
WE IMPROVE THE COVERAGE OF YOUR NETWORK

TETRA Combining Systems
- Available for 380-430MHz and 800MHz
- Hybrid and Cavity type Transmitter Combiners
- Expandable Receiver Multicouplers
- Band Pass and Band Pass-Band Reject Duplexers
- Band Pass and Notch type Filters
- Wide line of Power Splitters

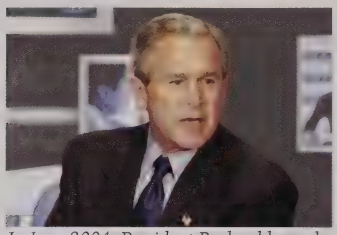
Repeaters
- Available for TETRA, GSM (900 & 1800), CDMA (800 & 1900)
- Full Band, Band Selective (0.2 to 15MHz) and Channel Selective (up to 8 channels)
- Software programmable
- Fully remote controlled (wireless modem)
- For Indoor and Outdoor coverage
- Urban or Rural scenarios

Tower Mounted Amplifiers
- Available for TETRA, GSM (900 & 1800), CDMA (800 & 1900)
- Receive Only and Dual Duplexed types
- Compatible with all BTS (DC power and alarms)
- Dual balanced LNA for system redundancy
- Very low noise and high lineality
- Dual band models available

fiplex
COMMUNICATIONS INC.
www.fiplex.com

Fiplex USA
Ph +1 305 884 8991 • Fax +1 305 884 4041
7331 NW 54 St-Miami, Fl 33166-USA • E-mail: info@fiplex.com
Fiplex Europe
Ph. +34 91 662 58 66 • Fax + 34 91 662 58 79 • POBox 1009-28108,
Alcobendas, Madrid, Spain • E-mail: europe.sales@fiplex.com
Fiplex Brazil
Tel (11) 5574-5282 • Cel (11) 9269-7873 • Rua Carlos Petit, 161
Conj. 51 • Sao Paulo-SP.-CEP04110-7873
rzarpelao@machelectronics.com

CIRCLE #16



In June 2004, President Bush addressed a National Telecommunications and Information Administration (NTIA) audience on the administration's plans to improve spectrum policy.

Plans must also include details on how to promote spectrum efficiencies. Six months after receiving the reports, the secretary of commerce is required to integrate the plans into a federal strategic spectrum plan.

The FCC, along with the Department of Homeland Security, are required to identify the future spectrum needs of the private sector and public safety community, taking into consideration state, local, tribal, and regional government requirements by June 2005. A spectrum needs plan for public safety and government operations is to be delivered to the president by December 2005.

Meanwhile, President Bush's fiscal year 2006 budget includes a 4 percent increase for the FCC, to a total of $304 million, which will be used for increases in employee salaries and consolidating operations in its Columbia, Md., laboratory.

LMCC Requests Partial Stay of 900 MHz Rules

The Land Mobile Communications Council (LMCC) asked the FCC to stay the effective date of its rules that permit conversion of 869-901/935-940 MHz business and industrial land transportation (B/ILT) frequencies to commercial services. The council asked the FCC to impose the stay only on stations that acquired licenses after the rules were adopted. Nextel Communications filed an opposition statement to the stay request, arguing that the current freeze on new 900 MHz applications is the best course of action to limit speculative activity in the band.

FCC Considers Use of 900 MHz "White Space"

The FCC issued a notice of proposed rulemaking that would open "white space" in the 896-901 MHz and 935-940 MHz B/ILT bands for other wireless service uses. "Consistent with the recommendations of the FCC's Spectrum Policy Task Force, the commission's proposal would give new license holders in the 900 MHz band the flexibility to provide any fixed or mobile service pursuant to the allocation for this spectrum, which includes commercial mobile radio services (CMRS)," according to an FCC release.

New 900 MHz licensees will be required to provide the same interference protection for incumbent 900 MHz B/ILT licensees as is afforded to 900 MHz SMR licensees. The commission is seeking comment on the order, including whether additional interference protection requirements are necessary and what those protections should include. Meanwhile, the freeze on new 900 MHz licenses remains in effect while the FCC considers the rule changes.

FCC Promotes Wireless Broadband

The FCC's Wireless Broadband Access Task Force issued its recommendations for what actions the commission should take to expedite deployment of wireless broadband in the United States. "To ensure that our nation's regulatory policies concerning wireless broadband do not impede innovation or delay service availability across America, the FCC should be vigilant and proactive in identifying and understanding emerging technologies and in ensuring that existing regulatory policies do not get in the way of these advances," according to a task force statement.

Among the recommendations, the task force advised the FCC to expedite the transition of digital television spectrum in the 700 MHz band for public safety communications and advanced wireless services. While the transition takes place, the task force recommends the FCC consider additional mechanisms to exploit 700 MHz channels for wireless broadband services. The task force also advocated voluntary frequency coordination efforts by private industry for license-exempt spectrum to mitigate potential interference among users.

WTB Announces New PS/CI Division Appointments

John Muleta, chief of the commission's Wireless Telecommunications Bureau (WTB), announced new appointments in the Public Safety and Critical Infrastructure Division. Scot Stone, who has served as assistant chief of the division since its formation in 2003, was named deputy division chief for

TRANSACTIONS

- **Digital Dispatch** landed a contract to provide 250 iPilot 8000 mobile computers to a major western U.S. transit agency. The system will operate on the Verizon Wireless CDMA network. The company also said it would provide its PathFinder application for public wireless data network services to Newton Whalley Hi-Way Taxi of Surrey, British Columbia.
- **Integrated Decision Support Systems** announced Voyager Express, H.O. Wolding, and RBX Transportation as customers of its Netwise Enterprise software system for load evaluation. The company also announced that Jeff Foster Trucking licensed its Trip Alert and Expert Fuel asset-monitoring software.
- The FCC named **Comarch**, an Andrew Corp. company, as microwave link registration database manager for 71-76 GHz, 81-86 GHz, and 92-95 GHz licenses.
- **Unity Wireless** announced a $100,000 contract with one of its current OEM customers to provide base station power amplifiers for use in a system field trial.

NEW PELTOR® WIRELESS SOLUTIONS

HEADSETS

NO MORE WIRES TO TANGLE FROM HEADSET TO RADIO.

Bluetooth®: Connection without the restriction of wire.

Our new two-way Wireless Solutions Headsets with Bluetooth technology "synch-up" – not hook-up – with most major brands of radios including Motorola, Kenwood, Icom and Aircraft Ground Operation. So workers get something they've never had before: clear transmission/reception with the **freedom to move up to 50 feet away from their radios, without hassling with wire.**

Break free from the tangle. Specify Peltor Wireless Solutions Headsets.

PELTOR®

The Sound Solution

For more information call 800-665-2942 or visit www.peltorws.com

See Us at IWCE, Booth 10047 CIRCLE #17

The Bluetooth® word mark and logos are owned by the Bluetooth SIG, Inc. and any use of such marks by Peltor is under license.

legal. Jeffrey Cohen was appointed deputy division chief for spectrum policy. Most recently, Cohen was a partner with the Washington, D.C., law firm of Wilkinson Barker Knauer. Shellie Blakeney, formerly legal advisor on regulatory matters in the office of the WTB bureau chief, was appointed associate division chief for interoperability. Angela Giancarlo was named associate division chief for spectrum policy. Prior to her appointment, she was a senior associate in the office of Hogan & Hartson, a Washington, D.C., law firm.

AMTS Auction Scheduled for August

The FCC announced August 3rd as the start date for 10 automated maritime telecommunications system (AMTS) licenses in the 217 MHz and 219 MHz bands. Although the frequencies' primary use will be for marine-based communications, land use is permitted on a secondary basis.

ASSOCIATIONS

Tom to Head PTC

Stephen G. Tom was named executive director of the Pacific Telecommunications Council (PTC), an international organization promoting information and communications technology development in the Pacific hemisphere. Previously, Tom was president of Teleport Consulting Group International. He was also chairman of the Society of Satellite Professionals International and the World Teleport Association.

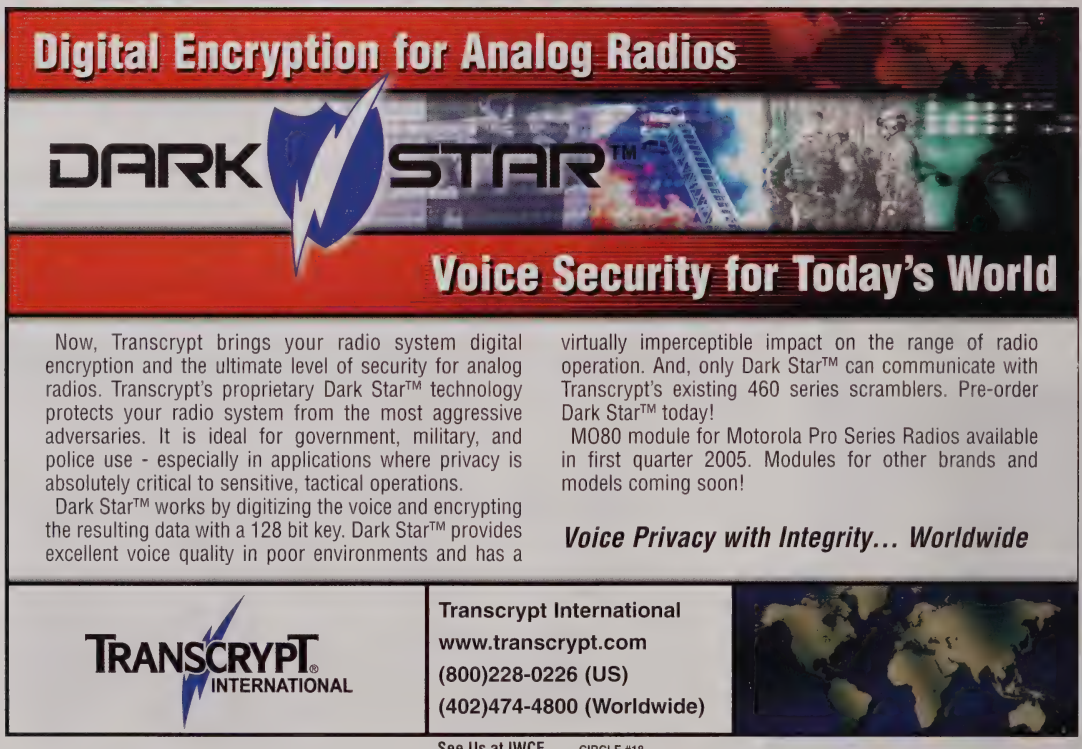
CANADIAN NEWS

IC Holds Phase Two of WCS, FWA Auction

In January, Industry Canada (IC) held the second phase of its residual license auction in the 2300 MHz wireless communication services (WCS) band and 3500 MHz fixed wireless access (FWA) band. IC awarded 306 licenses to 12 companies. The auctions are designed to facilitate implementation of advanced wireless services in both urban and rural areas. The second phase includes five licenses in each of the 172 service areas across the country, as well as licenses contested in phase one of the bidding process held in September 2004.

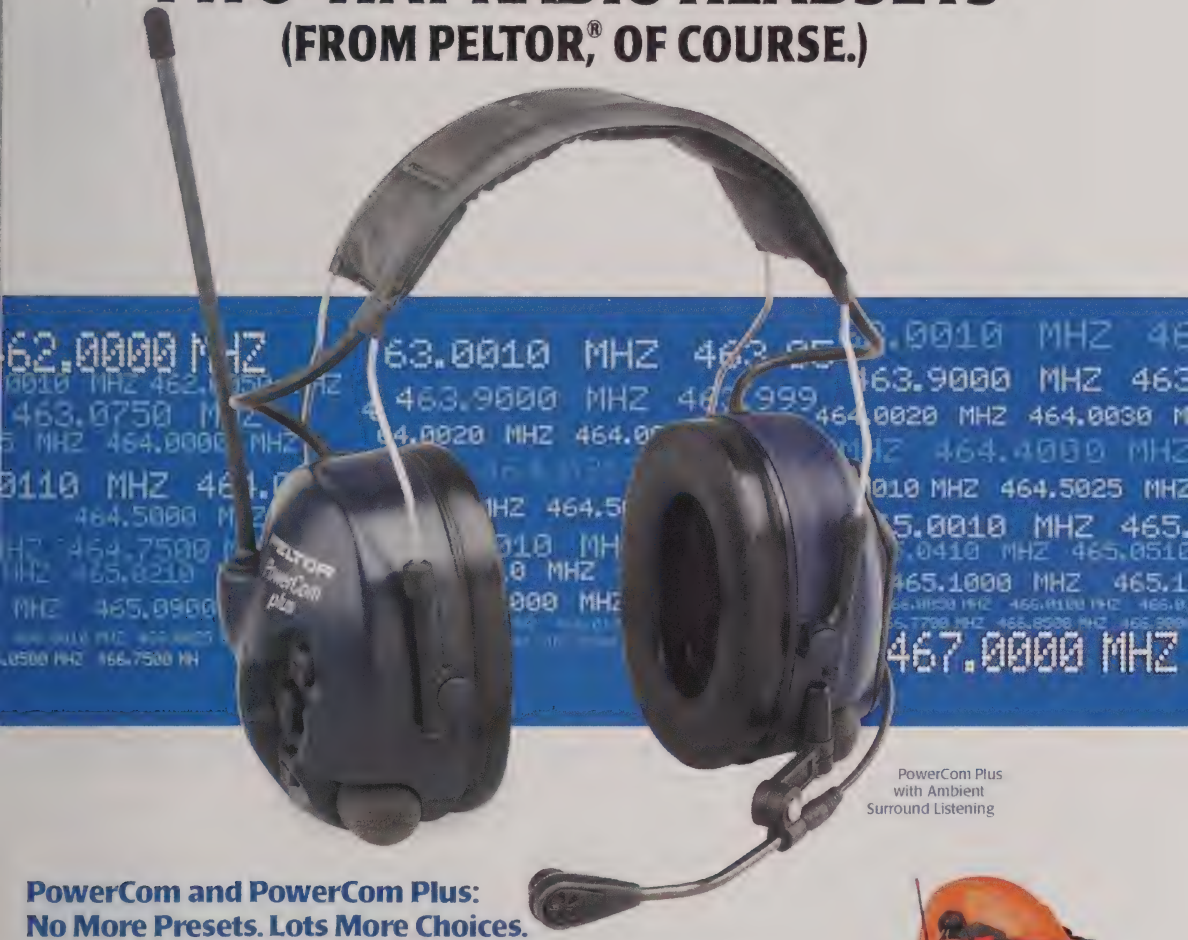
ALLIANCES

- **Mentor Engineering**'s Mobile Data Computer and **XGate** middleware products were certified for the **Dataradio** private wireless data network.
- **Andrew** and **dbSpectra** entered an agreement whereby dbSpectra has the option to manufacture and sell legacy Decibel Products brand isolators, duplexers, filters, and combining equipment.
- **Cambridge Position Systems** and **Trimble** entered an agreement to jointly develop enhanced GPS (E-GPS) location solutions for wireless networks and mobile devices.


Digital Encryption for Analog Radios
DARK STAR™
Voice Security for Today's World
Now, Transcrypt brings your radio system digital encryption and the ultimate level of security for analog radios. Transcrypt's proprietary Dark Star™ technology protects your radio system from the most aggressive adversaries. It is ideal for government, military, and police use - especially in applications where privacy is absolutely critical to sensitive, tactical operations.
Dark Star™ works by digitizing the voice and encrypting the resulting data with a 128 bit key. Dark Star™ provides excellent voice quality in poor environments and has a virtually imperceptible impact on the range of radio operation. And, only Dark Star™ can communicate with Transcrypt's existing 460 series scramblers. Pre-order Dark Star™ today!
MO80 module for Motorola Pro Series Radios available in first quarter 2005. Modules for other brands and models coming soon!
Voice Privacy with Integrity... Worldwide
TRANSCRYPT® INTERNATIONAL
Transcrypt International
www.transcrypt.com
(800)228-0226 (US)
(402)474-4800 (Worldwide)
See Us at IWCE CIRCLE #18

THE ONLY UHF PROGRAMMABLE TWO-WAY RADIO HEADSETS

(FROM PELTOR® OF COURSE.)



PowerCom Plus
with Ambient
Surround Listening

PowerCom and PowerCom Plus: No More Presets. Lots More Choices.

Peltor PowerCom and PowerCom Plus headsets are now frequency programmable between 462-467 MHz. And both are compatible with other 2-way radios programmed to the same frequency.

So now the most convenient way to communicate in noisy environments – completely wireless and self-contained – is more versatile.

Choose PowerCom and PowerCom Plus from Peltor.
The only two choices – that give you choices.

Forestry Version
Now Available!

30 Channel Capability • 38 CTCSS Privacy Tones • 12.5/25 kHZ Channel Spacing • Rechargeable Battery Pack • VOX or Cup Mounted PTT

For more information call 1-800-665-2942 or visit www.peltor.com

PELTOR®

The Sound Solution

See Us at IWCE, Booth 10047 CIRCLE #19

BUSINESS

Florida to Implement Motobridge Solution

The Florida State Technology Office awarded Motorola a contract for a statewide interoperable communications system using the company's new soft-switch technology, Motobridge IP. According to Motorola, Motobridge IP enables agencies to talk with one another regardless of the type of system or frequencies they use. Because of its IP-based design, users also can access a variety of features such as emergency unit identification.

Umatilla, Morrow Counties Launch Integrated CAD System

Computer Information Systems announced the completion of a new CAD and mapping system linking police, fire, EMS, and emergency operations centers in Oregon's Umatilla and Morrow counties. Three dispatch centers and 11 public safety agencies will use the system to serve 19 emergency response sites.

"One feature of the system that is of major importance to our operation is the complete integration of mapping using our ESRI-based maps with the CAD system," said Kathy Lieuallen, systems project director. In addition to map displays showing the location of their own police, fire, and ambulance units, dispatchers at the Umatilla Dispatch Center, Morrow Dispatch Center, or Hermiston Dispatch Center can view the locations of other centers' units during regional crises.

"With this CAD system's mapping, agencies now have an extraordinary tool that provides them instant map visualization of public safety operational situations in the field anywhere in our region," Lieuallen stated.

WyoLink Project Seeks to Incorporate Motorola Equipment

The Wyoming Transportation Commission authorized negotiations with Motorola to provide equipment and services for the WyoLink project. The goal of the project is to integrate communications for local, state, and federal public safety agencies through a statewide, VHF, digital radio system with low-speed data, AVL, and encryption capabilities.

M/A-COM Awarded $1.3 Million Contract

M/A-COM announced it has been awarded a $1.3 million contract by the county of Albemarle, Va.; the city of Charlottesville, Va.; and the Rector & Board of Visitors of the University of Virginia (UVA). The company will provide a shared, interoperable mobile data communications system for the Emergency Communication Center (ECC), which coordinates all police, fire, and EMS emergency and non-emergency requests for Albemarle County, Charlottesville, and UVA. The IP network solution will incorporate M/A-COM's OpenSky wireless data system in combination with Cisco Aironet access points, mobile client software from Fatpot Technologies, and mobile data computers from Panasonic.

Jefferson County Installs Intraplex SynchroCast System

Harris Corp., in conjunction with Midwest Radio Systems Inc., announced the sale and installation of Intraplex SynchroCast multiplexers for the Jefferson County Sheriff's Department and 9-1-1 dispatch center located near St. Louis, Mo. Harris will install the multiplexers at five sites, providing each with five-channel simultaneous communication capabilities and seven site receivers per channel.

NSF Awards Audiopack Grant for Radio System Development

Audiopack Technologies received a National Science Foundation (NSF) Small Business Innovation Research (SBIR) award for the development of a new radio system capable of reliably transmitting data from first responders inside buildings to the commander and rescue team outside. The company plans to combine an ad hoc networked radio system — currently in development — with its personal accountability system.

Ticket to Ride

Speeders beware. The West Orange Police Department recently became the first agency in southeast Texas to equip its officers with electronic ticket writers. From Berendo Solutions, the handheld computer devices enable officers to swipe driver's licenses instead of handwriting the information. Once the offender signs the handheld device with a digital pen, the officer can print the ticket on site from a small, portable printer.

Although the system does not yet connect wirelessly to a central database — officers synch up and transfer information at headquarters — the ticket writers are expected to reduce the possibility of errors and increase officer efficiency. In addition, the system will decrease the amount of time court personnel spend processing citations. The cost of the ticket writers is covered through the fine and court costs portion of citations.

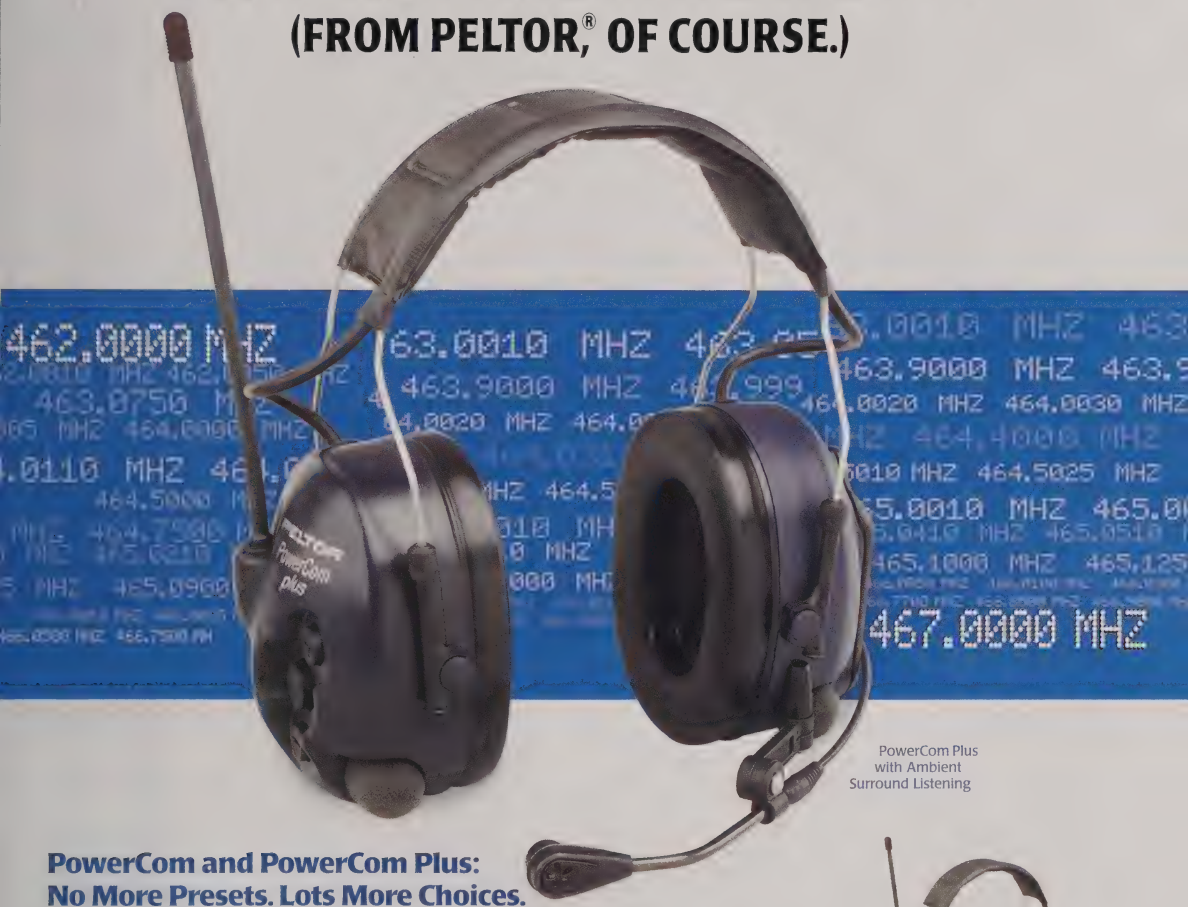
PEOPLE

Teltronics Names Ziemann GM of Public Safety Group

Teltronics appointed Don Ziemann as vice president and general manager of its Public Safety Systems Group (PSSG). Most recently, Ziemann was vice president of operations for

THE ONLY UHF PROGRAMMABLE TWO-WAY RADIO HEADSETS

(FROM PELTOR,® OF COURSE.)



PowerCom Plus with Ambient Surround Listening

PowerCom and PowerCom Plus: No More Presets. Lots More Choices.

Peltor PowerCom and PowerCom Plus headsets are now frequency programmable between 462-467 MHz. And both are compatible with other 2-way radios programmed to the same frequency.

So now the most convenient way to communicate in noisy environments – completely wireless and self-contained – is more versatile.

Choose PowerCom and PowerCom Plus from Peltor.
The only two choices – that give you choices.

30 Channel Capability • 38 CTCSS Privacy Tones • 12.5/25 kHZ Channel Spacing • Rechargeable Battery Pack • VOX or Cup Mounted PTT

PowerCom

For more information call 1-800-665-2942 or visit www.peltor.com

PELTOR®

The Sound Solution

See Us at IWCE, Booth 10047 CIRCLE #20

Comnet Messaging. He also held management positions with AT&T/Bell Laboratories and Lucent Public Safety Systems as director of product management and business operations.

EFJohnson Names O'Hara President

Ellen O'Hara was named president and COO of EFJ subsidiary EFJohnson, a manufacturer of two-way radios. Prior to joining the company, O'Hara was with Motorola where she held various senior-level management positions, including vice president and general manager of the radio products division and vice president and director of subscriber operations. "Ellen's experience in managing a global business, coupled with her extensive track record of leadership in the communications industry, provides us with a strong leader to continue building EFJohnson into the future," said Michael Jalbert, EFJ chairman and CEO.

ASSOCIATIONS

ASAE, CALEA Recognize APCO Achievements

APCO received the Award of Excellence in the 2005 Associations Advance America Awards program, a national competition sponsored by the American Society of Association Executives (ASAE). The association was recognized for its Public Safety Foundation of America (PSFA), a group dedicated to providing funding and technical support to PSAPs to enable the implementation of wireless E9-1-1.

APCO also received an Award of Appreciation from the Commission on Accreditation for Law Enforcement Agencies (CALEA), with which it developed the Public Safety Communications Accreditation Program in 1996.

Kent State University Joins APCO EMD Program

The Kent State University (KSU) Police Services Department began implementation of the APCO Institute Emergency Medical Dispatch (EMD) program. With an annual call volume of more than 18,000, the KSU Police Services Department provides 9-1-1 services to the main campus, which has a population of approximately 29,000, and to Ohio's Brimfield Township, which has a population of 9,000.

NENA Approves PSAP Operational Standards

NENA recently approved three new operational standards for PSAPs: the "IP Capable PSAP Features and Capabilities Standard" (58-001), which lists capabilities or features PSAPs need to support using IP-based 9-1-1 equipment and software; the "TTY Training Operational Standard" (52-001), a standard operating procedure for comprehensive TTY training of PSAP personnel; and the "Managers' Guide to the ADA: Title II, Direct

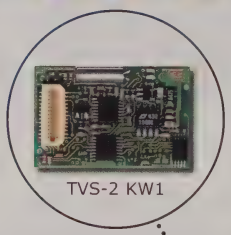
PLUG-IN VOICE SECURITY & ANI FOR KENWOOD TK-2180/3180 & TK-7180/8180

TVS-2-KW1 Rolling Code Features:
- Protects against determined listeners
- Total of 40 trillion possible code key combinations
- Detects & descrambles secure audio automatically

VPU-15-KW1 Speech Inversion Features:
- Protects against casual listeners
- 37 inversion codes to choose from
- Automatically detects scrambled/clear audio (when used with VPU-15 series)

VPU-11-KW1 Speech Inversion Features:
- Protects against casual listeners
- Factory programmable to ANY inversion frequency between 2000-4096 Hz

ANI-F-KW1 Automatic Number Identification Features:
- **Digital formats include:** Motorola's MDC-1200®/600® & M/A-COM's G-Star™
- **Analog formats include:** 5-tone, DTMF, 2-tone, Burst Tone, & specialty tones


TVS-2 KW1

MIDIAN ELECTRONICS

Plug-in modules also available for: Motorola, Vertex, Tait, Icom & Maxon

2302 E. 22nd Street • Tucson, AZ 85713 • USA
1-800-MIDIANS or 520-884-7981 • www.midians.com • sales@midians.com

See Us at IWCE CIRCLE #21

It's All About ACCESS.

What if your communications system featured an IP backbone that allowed communications between anyone, on any network, regardless of type, network or manufacturer?

What if your communications system could support multiple air interfaces, allowing each system to operate independently while maintaining network compatibility?

What if this same communications system was future-ready, providing a clean migration path to tomorrow's voice and data offerings without fear of obsolescence?

What if you could have Voice, Interoperability, Data and Access all on ONE Network?

It's the Network. It's Here.

VDA

Voice. Interoperability. Data. Access.

tyco | Electronics

M/A-COM

M/A-COM offers a full line of communications systems supported by the VDA network, including OpenSky, NetworkFirst, M/A-COM's P25™ and connectivity to EDACS systems.

For more information: 1 800 528 7711 • www.macom-wireless.com

See Us at IWCE, Booth 4009 CIRCLE #22

© 2004 M/A-COM, Inc.

Interoperable command post on the National Mall in Washington, D.C., during the 2005 presidential inauguration.

Wireless Plays Vital Role in Presidential Inauguration

CommTech (formerly AGILE), a communications interoperability and information-sharing program funded by the National Institute of Justice (NIJ), spearheaded a communications network spanning from the District of Columbia to Fairfax County (Va.). This collaborative effort between multiple law enforcement agencies — the U.S. Marshal Service, U.S. Parks Police, the Department of Homeland Security, and local police and fire departments — and technology companies provided a state-of-the-art interoperable command center to support communications during the January presidential inauguration events.

Under tight security, one of the command posts was positioned inside Washington's mall where the STI-CO interoperable antenna was deployed with an ACU-1000 interoperability unit from Raytheon JPS Communications. At another site in Alexandria, Va., the STI-CO antenna connected with the Sytech's Radio Interoperability System (RIOS), which supported the remote gateway for intelligence gathering in Fairfax County.

The multisite operation to increase security inside and outside the Washington Beltway provided communication redundancy. Safeguarded with more than 6,000 uniformed police officers from local agencies throughout the nation and numerous federal law enforcement agencies, the inauguration ceremonies went off without a hitch.

Access Operational Standard" (52-002), which is designed to assist managers in bringing PSAPs into compliance with the Americans with Disabilities Act (ADA). Copies of the standards are available on the association's Web site, www.nena.org.

APCO Conducts VoIP Testing

APCO, in collaboration with The Consultant Registry and the Georgia Public Safety Training Center, conducted a test related to how background sounds such as human speech, gunfire, and residential fire alarms — all of which are important to 9-1-1 call takers — are transmitted over a VoIP system. In the test, three simultaneous calls were placed to the Monroe County, Ga., PSAP via a traditional phone, a wireless phone, and a VoIP phone.

APCO to Honor Powell, McCain

APCO announced outgoing FCC Chairman Michael Powell and Arizona Senator John McCain (R-Ariz.) as honorees at its first Public Safety Communications Leadership in Policy Awards Dinner, to be held April 12 at the Park Hyatt in Washington, D.C. APCO also announced former Homeland Security Secretary Tom Ridge as the keynote speaker at its annual conference and exhibition in Denver, Aug. 21-25, 2005.

REGULATORY

EIC, DHS Promote Data-Sharing Standards

The Emergency Interoperability Consortium (EIC) signed a memorandum of agreement (MOA) with the Department of Homeland Security (DHS) to promote the development and proliferation of data-sharing standards for emergency response. The agreement establishes an alliance between the organizations to jointly promote the design, development, release, and use of XML standards to help solve data-sharing problems commonly encountered during emergency operations. The term of the agreement is three years.

Initial collaborative efforts between the DHS and EIC resulted in the Common Alerting Protocol (CAP), a 2004 data standard for sharing alert information between dissimilar systems. Currently, the organizations are working to develop Emergency Data Exchange Language (EDXL), which addresses the routing and substance of a variety of interagency emergency messages.

FCC Expands MSS Operational Rules

The FCC finalized its new rules governing the use of ancillary terrestrial components (ATCs) with mobile satellite services (MSS). The rules allow for greater uplink and downlink capacity for high-speed data services.

"This architecture holds great promise for all Americans, but offers particular benefits to residents of rural areas and those federal, state, and local agencies that are charged with protecting public health, safety, and security," said Alexander Good, vice chairman and CEO of Mobile Satellite Ventures (MSV), a provider of ATC technology. "The key advantages of implementing ATC are that it allows ubiquitous interoperability and redundancy that is vital to homeland security applications."

MSV has proposed a hybrid cellular/satellite technology that facilitates voice, data, and imaging applications for first responders.

FCC Extends Narrowband Deadline for 700 MHz Band

The FCC has deferred its ban on the marketing, manufacture, and importation of equipment solely capable of utilizing 12.5-kilohertz bandwidth in the 700 MHz public safety band from Dec. 31, 2006, to Dec. 31, 2014. In its recent order, the commission also deferred the prohibition of filing applications for new systems utilizing 12.5-kilohertz voice channels until Dec. 31, 2014.

Ritron® OutPost Increases Public Safety.

Critical emergency and public safety applications require immediate response! Yet, oftentimes, the person requiring assistance may not be able to adequately describe their location.

The wireless OutPost Callbox provides the solution. It is compatible with a variety of ANI protocols such as MDC-1200, GE-Star and DTMF ANI. Once the OutPost Callbox PTT button is pressed, the installed encoder sends the callbox location information to a decoding unit. Assistance can then be dispatched immediately.

In addition to uses on greenways and walking/biking paths other OutPost callbox applications include: Airports, Hospitals, Schools, Beaches, Marinas, Pools, Amusement Parks, Campgrounds, Construction sites, Warehousing, Manufacturing, and Assembly lines.

Since 1977, Ritron has been designing, manufacturing, and marketing radio communication products and systems worldwide. For more information on how Ritron products will increase public safety in your community,

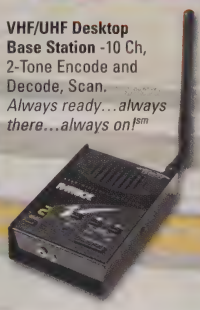
Call 800-USA-1-USA

or visit us at www.ritron.com

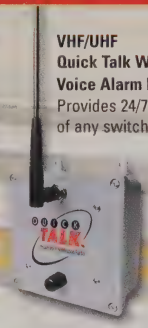
Available in VHF, UHF frequency bands, and UHF LTR and PassPort trunking protocols.

Ritron has a full complement of wireless products for your 2-way radio communication needs.

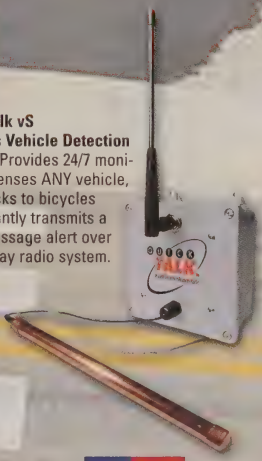
VHF/UHF Portable 2-way Radios -10 Ch, 2-Tone Encode and Decode, Scan



VHF/UHF Desktop Base Station -10 Ch, 2-Tone Encode and Decode, Scan. *Always ready...always there...always on!*sm



VHF/UHF Quick Talk Wireless Voice Alarm Reporter - Provides 24/7 monitoring of any switch or sensor.



VHF/UHF Quick Talk vS Wireless Vehicle Detection System -Provides 24/7 monitoring. Senses ANY vehicle, from trucks to bicycles and instantly transmits a voice message alert over your 2-way radio system.

WIRELESS COMMUNICATIONS SINCE 1977 25 YEARS RITRON

Go Beyond Normal Limits...sm

RITRON® WIRELESS SOLUTIONS

MADE IN THE USA

P. O. Box 1998 Carmel, IN 46032 • 317-846-1201 • fax: 317-846-4978 • email: sales@ritron.com

See Us at IWCE, Booth 5019 CIRCLE #23

TRANSACTIONS

• **New World Systems** signed a $700,000 contract with Michigan's Shared Information Network Consortium (SINC) to provide its Microsoft Windows-based Aegis/MSP public safety software and services.

• **Relm Wireless** received a $700,000 order from the California Dept. of Forestry for its BK Radio-brand portable two-way transceivers.

• **SkyLynx Communications**, a wireless data network provider, reached an agreement with Rural/Metro Ambulance, a provider of medical transport services, to provide network services for the western portion of Washington state.

• The Canadian Ministry of Health purchased and distributed 30 9-1-1 StarZ call-taking and radio dispatch training simulators from **Professional Pride**.

• The Fort Smith, Ark., police department awarded **Dataradio** a contract to upgrade its existing mobile data system. The company will also provide 100 GeminiPD mobiles and five Paragon base stations to fire and EMS fleet personnel in St. Charles County, Mo.

• **VisionAIR** announced a new contract with the Clarksville Police Department in Tennessee, which purchased its VisionRMS law enforcement RMS.

• **VisionTEK** signed an agreement with the Center of Rural Development in Somerset, Ky., to provide a mobile data solution for its local agencies as part of the center's Law Enforcement Technology (LET) program.

• Surrey Fire Services in British Columbia selected **FDM Software**'s CAD and RMS software for dispatch operations supporting 17 fire halls.

• EFJ subsidiary **EFJohnson** received two contracts from the U.S. Department of Defense valued at $1.8 million for Project 25 radios and accessories.

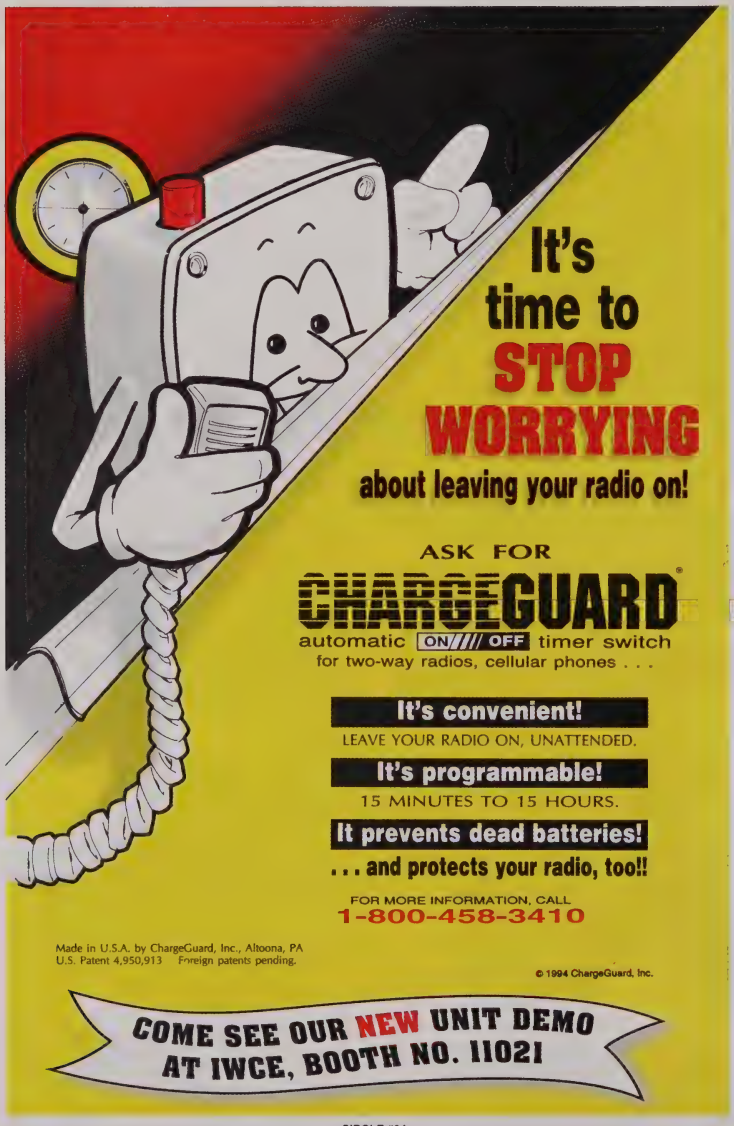
• **Stone Mountain** was named the exclusive supplier of speaker microphones and audio accessories by the city of San Antonio for use by public safety agencies.

• The Royal Canadian Mounted Police (RCMP) deployed the ExpressQ message queuing and MSS Smart IP network switching software from **Broadbeam Corp.**

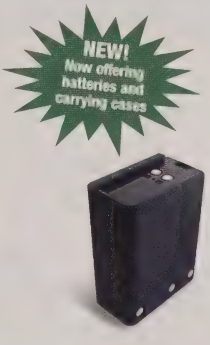
ALLIANCES

• **Teltronics** announced it signed an OEM agreement with **Conveyant**, a provider of PC consoles, for its Telident 9-1-1 products.

• **Alluviam** and **FieldSoft** integrated Alluviam's HazMaster G3 hazmat/chem/bio/WMD response capabilities with FieldSoft's FDonScene software, enabling first responders to take advantage of both software applications within a single integrated environment.


It's time to STOP WORRYING about leaving your radio on!
ASK FOR
CHARGEGUARD®
automatic ON//// OFF timer switch
for two-way radios, cellular phones . . .
It's convenient!
LEAVE YOUR RADIO ON, UNATTENDED.
It's programmable!
15 MINUTES TO 15 HOURS.
It prevents dead batteries!
. . . and protects your radio, too!!
FOR MORE INFORMATION, CALL
1-800-458-3410
Made in U.S.A. by ChargeGuard, Inc., Altoona, PA
U.S. Patent 4,950,913 Foreign patents pending.
© 1994 ChargeGuard, Inc.
COME SEE OUR NEW UNIT DEMO AT IWCE, BOOTH NO. 11021
CIRCLE #24

Valuable Solutions, Unlimited Applications



Two-Way Radio Accessories from OTTO, the Leader in High-Performance Communication Products

Vireo products were designed and tested for users in the retail, hospitality and recreational markets. From earhangers to headsets to speaker microphones, Vireo offers a variety of choices for communication accessories.

- Proven quality from OTTO.
- Supports a wide range of radio platforms.
- All products come with a 90-day warranty.
- Now offering batteries and carrying cases.

Vireo by OTTO®
Carpentersville, IL 60110, U.S.A.
www.vireocom.com

vireo by OTTO

® Registered trademark of OTTO Engineering, Inc.
All rights reserved. Publication 2004-28

Your complete source for two-way radio accessories

See Us at IWCE, Booth 4051

CIRCLE #25

Private vs Commercial Networks

The debate over which type of network is best for mission-critical communications takes center stage in this issue. On the following pages, you'll find a collection of articles representing viewpoints from both private and commercial wireless insiders. After reading what our participants have to say, you'll find that the controversy is not as clear-cut as it appears on the surface. Thanks to all those who took part in this "round table" of sorts, and as always, we would love your feedback to the viewpoints offered in this very special feature.

Which Network Option for Mission-Critical Wireless?

By Tom Hoyne

The wireless requirement of mission-critical users is straightforward: voice and/or data dispatch communications whenever and wherever it's needed, with no room for compromise. This need has been met by private wireless systems for more than 70 years.

Private systems still prevail among mission-critical users; however, users have expressed increased interest in obtaining service from commercial wireless carriers. This trend invokes a few important questions: Why are commercial wireless services more attractive to mission-critical users than ever before? What factors should mission-critical users consider when evaluating commercial service vs. private wireless? Are there compromises that can bring value?

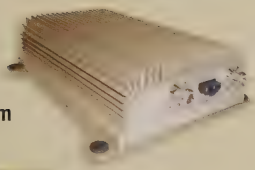
Today, commercial wireless networks can provide many of the functions that mission-critical users depend upon. They offer features such as full-duplex calling, roaming on other commercial networks, and over-the-air data rates that far exceed

Two technologies, one network.

IPSeries
Private Mobile Data System

Wide Area

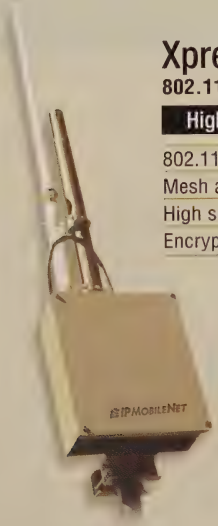
UHF, VHF, 700 MHz or 800 MHz
Native IP network architecture
19.2, 32, or 64 Kbps over the air
Designed for public safety



XpressNet
802.11 Mesh Network

High Speed

802.11 a, b or g
Mesh architecture
High speed client connect
Encryption and authentication



XpressNet, high-speed access to the network through distributed, mesh-connected access points.

IP Series provides wide-area, reliable coverage for mobile access to the network.

IPMobileNet's, XpressNet 802.11 product, combined with IP Series wide area end-to-end IP mobile data system provides secure, reliable wireless networking that is easy to maintain.

Secure. Reliable. Easy.

800.348.1477 **www.ipmn.com**

IPMOBILENET

See Us at IWCE CIRCLE #26

©2005 IPMoblieNet, Inc. All rights reserved.

those of a typical private system. When you sign on with a carrier that offers the desired functions, you eliminate the high costs of procuring, operating, maintaining, and upgrading a radio system. For many, that represents a potential annual savings of millions of dollars.

Additionally, when a new technology hits the market, commercial network users can take advantage of it at little additional cost. The functionality offered by commercial networks is increasing while prices seem to keep falling. What more could one ask for?

The truth is that public safety agencies, utilities, and other mission-critical users are not scrapping their private radio systems. To understand why, look beyond the features and functions private wireless networks offer to the "must-have" attributes of a system that serves mission-critical users. It is these characteristics that ensure the features and functions are available whenever and wherever they are needed.

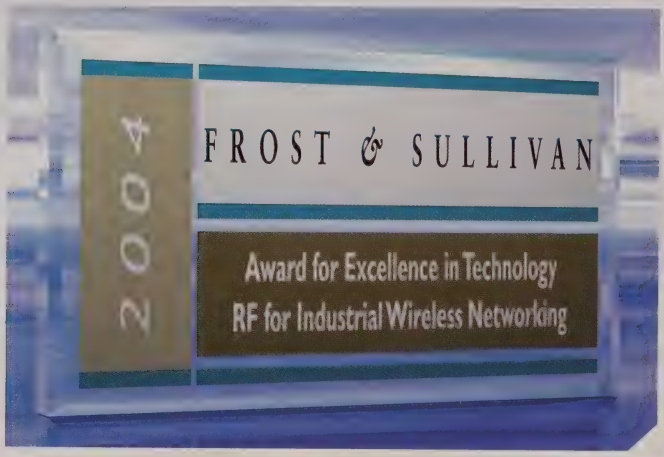
Typically, the most important communication system features for public safety agencies, utilities, and other mission-critical users are coverage, reliability, guaranteed access, flexibility and control, interoperability, and security.

When weighing a private network against a commercial network, consider the following questions: Does the commercial carrier provide complete coverage everywhere you need it? If not, will the provider be willing to build out the network to meet your coverage requirements? At what cost? And when the carrier introduces a new technology platform (e.g., GPRS), will its coverage footprint still be adequate for you? With a private system, you build out coverage according to your needs.

Can you configure and reconfigure talkgroups quickly on the commercial network you're considering? Can you easily deploy/locate dispatch positions where you need them? Can you change priority and other privileges to talkgroups or individual users whenever necessary? This kind of flexibility is inherent in a private network.

Will your users be able to talk to other agencies or organizations and/or their dispatchers with their existing radios or handsets on the commercial network? And is the commercial network secure?

Today, it's relatively easy to provide interoperability for users of disparate private wireless networks. Private systems also can provide encrypted voice for those who need additional security. →



MDS RECEIVES FROST & SULLIVAN'S 2004 EXCELLENCE IN MOBILE COMMUNICATIONS AWARD

MDS has received the prestigious Frost & Sullivan Mobile Communications Excellence in Technology Award in the category of RF for Industrial Wireless Networking. This Award was given to us for our performance and achievements in wireless and mobile strategy, technology, and services. The honor recognizes the innovation and superior technology behind our industrial wireless networking radios used for fixed and mobile communications.

"MDS radios enable mission critical communications, increased safety, improved revenue, and greater efficiency in tough industrial climates for customers in the oil and gas, water and wastewater, electric utilities, telecom, and public safety sectors," notes Frost & Sullivan research analyst Miriam Nagel.

Frost & Sullivan presents its Excellence in Technology of the Year Award to MDS for pioneering industrial wireless networking technology into the market and for continuing to make significant contributions to the industry.

WE BRING WIRELESS MISSION CRITICAL COMMUNICATIONS TO THE HARSHEST PLACES ON EARTH.

©Microwave Data Systems 2004

585.242.960

See Us at IWCE, 13010 CIRCLE #27

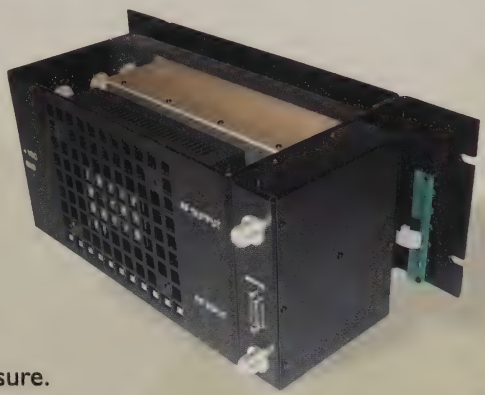
TPL's Newest Power Amplifier...The Smart RXR

Visit our booth 8007 at IWCE in Las Vegas

TPL's RF power amplifiers continue to be the number one RF power amplifier on the market today. TPL's engineering staff has shown it's ability to utilize its extensive knowledge to provide products that meet your needs.

Features

- Power Level up to 125 Watts.
- Accommodates all bands from 35 to 960 MHz.
- VSWR & Over Temperature Protection (Power Reduction).
- Feedback Controlled Output Level.
- Local Failure Monitoring.
- Outputs for Remote Monitoring,
- Indicator Lights For:
  - AC On
  - DC On
  - RF On
  - VSWR Alarm
  - Low Power Alarm
  - Over Temperature Alarm
- Cooling fan for continuous duty operation.
- Front panel circuit breaker/on-off switch.
- Flat front panel allows for cabinet door closure.
- Integrated Power Supply (Optional).



323.256.3000 / 1-800-HI-POWER

www.tplcom.com **sales@tplcom.com**

TPL COMMUNICATIONS
Employee Owned Company

CIRCLE #28

Private

Commercial

Networks

Perhaps the most important attributes of a wireless system for mission-critical users are reliability and guaranteed access. A mission-critical wireless system must deliver its best performance in the absolute worst of times. Even the best commercial networks often are not up to the task. Most commercial sites do not have the long-term automatic backup power that mission-critical systems depend on. Additionally, when a system is up and running during a crisis, it typically becomes overloaded with non-critical traffic.

During last year's hurricane season, hundreds of commercial sites simply went off the air, when public safety agencies and utility crews needed communications the most. By contrast, the majority of state, county, and utility networks still carried the traffic needed to facilitate cleanup and restoration.

Why don't carriers provide the reliability, system access (e.g., priority and capacity), and other special attributes that mission-critical users require? The answer is fairly simple: It is difficult for them to make a solid business case for those types of features. Mission-critical communications represents only a fraction of the overall wireless market, and commercial operators can't realistically consider providing special attention to such a small user group.

Is there a role for commercial carriers among mission-critical users? Of course. Most users already employ some form of commercial service on a daily basis to communicate with other personnel or the public outside of their private wireless network coverage. Many take advantage of the superior data rates found on commercial systems for database access, incident report filings, and work-order dispatch. There are efficiencies to be gained here, and it makes sense to leverage them.

We can expect, however, that private wireless systems will remain the preferred platform for mission-critical voice users for years to come. ■

The truth is that public safety agencies, utilities, and other mission-critical users are not scrapping their private radio systems.

—Tom Hoyne

Tom Hoyne is director of utility markets for M/A-COM Wireless. He has more than 30 years of experience in the electric utility marketplace, the past 12 of which have involved wireless solutions.

The Case for Commercial Networks in Private Enterprise

By Butch Musselman

As the public sector and related industries evaluate whether to upgrade, replace, or augment their communications systems, including private LMR networks, they need to be aware that the options are not restricted to private *or* commercial networks. New hybrid systems that integrate LMR with commercial wireless may best meet their communications needs.

Mission-Critical Communications

Nextel Communications makes a distinction between "critical infrastructure," which serves America's communities — gas, water, and electric utilities; railroads; air services; and municipal operations — and "mission-critical" communications such as our nation's first responders. We view mission-critical communications separately because of the life-and-death nature of their operations.

Commercial wireless systems are often appropriate for businesses, utilities, and public sector agencies. Conversely, a private LMR system is a necessary foundation for mission-critical voice communications. On the other hand, a commercial wireless network often fulfills all of the requirements for transmitting a mission-critical organization's data and text messages. Offloading data communications to a commercial network can free up the agency's

EVENTIDE VR725

With each new generation of digital loggers, Eventide keeps expanding memory and flexibility while enhancing reliability. Because we never forget what you're looking for in a logger.

The new VR725 Advanced Technology Logging and Archiving System is a case in point: it's the latest of our Linux-based loggers, offering dual DVD drives and scalability from 8 to 96 channels.

For memory, there are dual 250 GB hard drives that deliver continuous recording that can be measured in years rather than hours. There's also an optional 1 TB Hot Swap RAID-5 array that can yield over 14 channel years of continuous recording.

For flexibility, both analog and digital channels can be accommodated. Each analog channel is independently selectable for on/off-hook, VOX or continuous record. With ID and password protection, any PC in your network has access to its relational database, or use the optional Active Matrix TFT 7" touch screen interface. The VR725 can either be rack mounted or placed on a desktop.

For reliability, there are dual redundant power supplies. Plus, the VR725 is resistant to hard drive failure because of an advanced RAID system. Above all, there is Linux, which is inherently fast, reliable and secure. With Linux and our self-installing Call Browser, you get performance without licensing fees.

The Eventide VR725 is an outstanding value for voice and every other logging application. As it performs for you, day after day and year after year, it will be a constant reminder of everything a logger should be.

For more info call 201 641-1200 x264, email loggers@eventide.com or visit www.eventide.com

Eventide®

Eventide is a registered trademark of Eventide Inc. ©Eventide 2004

See Us at IWCE, Booth 1004 CIRCLE #29

primary voice communications system, helping to ensure that mission-critical voice communications go through when needed.

Hybrid public safety communications systems that integrate public safety LMR and commercial wireless networks are now available. Many systems now allow commercial wireless users to interoperate with existing two-way LMR systems.

For example, Nextel's Custom Network Solutions group has implemented dispatch consoles capable of interconnecting LMR systems with Nextel's digital iDEN technology. The consoles provide interconnection among two-way radios, public telephones, and other voice communications systems. The managed use of integrated commercial wireless and traditional systems has the potential to change public sector communications as we know it.

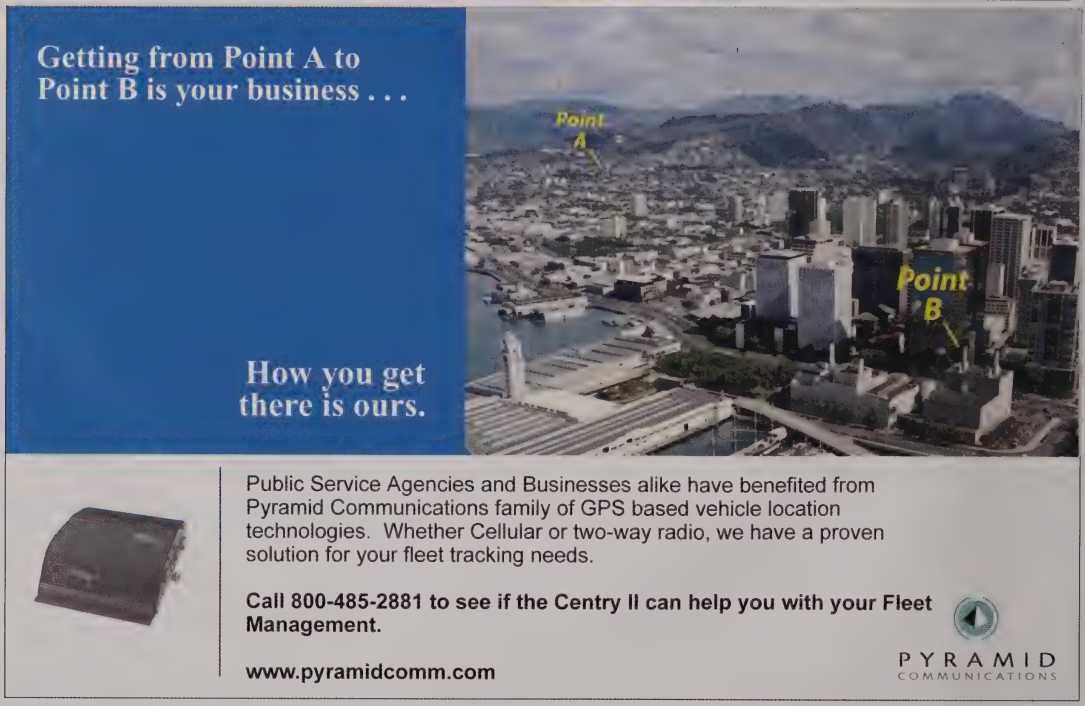
Commercial services, such as those offered by Nextel, will continue to augment and/or replace private LMR systems for utilities and other enterprise customers.

— Butch Musselman

Critical Infrastructure

As public sector and mission-critical agencies evaluate their core business needs, they are looking at how commercial wireless providers can meet their specific requirements. As a result, utilities that previously relied on private LMR systems are augmenting and/or replacing those systems with commercial wireless providers, such as Nextel. This is happening for several reasons, including the high cost of new digital LMR networks, which also require additional infrastructure, as well as the added expense of maintenance and upgrades during the life of the system.

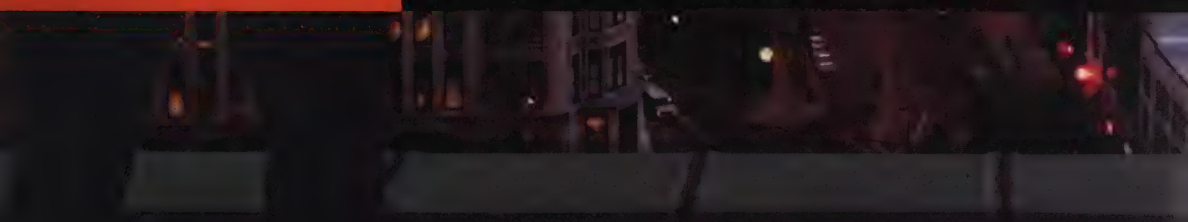
Commercial carriers can provide technologies that offer more features and benefits at a lower cost of ownership. They also maintain, manage, upgrade, and enhance their networks at no cost to the customer — all of which allows public sector and


Getting from Point A to Point B is your business . . .
How you get there is ours.
Point A
Point B
Public Service Agencies and Businesses alike have benefited from Pyramid Communications family of GPS based vehicle location technologies. Whether Cellular or two-way radio, we have a proven solution for your fleet tracking needs.
Call 800-485-2881 to see if the Centry II can help you with your Fleet Management.
www.pyramidcomm.com
PYRAMID
COMMUNICATIONS

See Us at IWCE CIRCLE #30

YOU CAN DO YOUR JOB BECAUSE WE DO OURS. JPS INTEROPERABILITY.

After 14 years of providing interoperable communications to the homeland security and public safety industry, you learn that those responsible for protecting our lives deserve the best technology. With more than 1000 time-tested units in the field, we are willing to put our reputation on the line; we have to because our customers put their lives on the line every day. Police, EMS, Fire, Highway and State Patrols, Military personnel and others know us for our ACU-1000 technology. They depend on us because we are the leaders in interoperability, and we are committed to their safety and that of those they protect. www.jps.com/leader 919.790.1011 **Please visit us at IWCE, Booth #11037.**



ACU-1000 TECHNOLOGY

FIXED SITE

TRANSPORTABLE

MOBILE CONFIGURATION

WIDE AREA INTEROPERABILITY SYSTEM (WAIS)™

OPERABILITY

Raytheon
JPS Communications

CIRCLE #31

mission-critical agencies to focus on their core business.

Public utilities today face the same challenge as private enterprise: They can no longer justify the cost for solutions that support just a minority of their users. In most cases, a commercial carrier may cover only 50 percent of a utility's service territory, yet cover 90 percent of the utility's users and customers because of population density. Utilities in this situation need to make decisions based on the communications needs of 90 percent of their employees, not the remaining 10 percent.

To support their workers and customers in these rural areas, many utilities are evaluating new approaches — such as hybrid systems combining commercial carriers — while keeping their existing private LMR system in place and/or considering satellite communications. Private LMR system users, such as utilities, also may have customers who prefer that money be spent on process, procedures, and equipment that will improve the reliability of services provided them.

Commercial services, such as those offered by Nextel, will continue to augment and/or replace private LMR systems for utilities and other enterprise customers. This trend will continue in the future. Five years from now, most private LMR systems — with the exception of public safety first responders (fire, police, and EMS) — will depend more heavily on commercial services than private LMR systems. ■

Butch Musselman is vice president for utilities at Nextel Communications and has more than 27 years experience in wireless communications and public utilities. Prior to joining Nextel, Musselman spent 15 years with Motorola in the Land Mobile Division where he was director of systems integration and regional sales manager.

One Solution Does Not Fit All

By Katherine Gomm

What has been true for decades is even more so now: Critical infrastructure (CI) entities must have viable wireless communication systems in place that operate reliably and efficiently.

Under regulatory and financial pressure, more and more CI entities are considering abandoning their private systems in favor of new offerings from commercial service providers. However, the alluring promise of new technologies and cost advantages in the commercial sector needs to be carefully considered in light of CI's fundamental requirements of reliability and availability, coverage, priority access, and control — the traditional strong points of private systems.

Making a new system choice is a challenge currently facing many in utility leadership. The United Telecom Council (UTC) and Booz Allen Hamilton just released a study titled "Decision Factors in Wireless Communications Systems for Utilities and Critical Infrastructure." An objective guide for executives involved in the decision-making process, the report features drivers and components to consider, along with side-by-side comparisons of commercial vs. private system performance, technology, and cost factor evaluations for wireless communications systems.

The main finding from the report is that no one solution is the right fit for all utilities.

For example, the Tennessee Valley Authority recently decided to implement commercial service at its generating facilities, while Florida Power & Light chose to upgrade its private system. In the commercial vs. private landscape, each system has its strengths and weaknesses depending on the wireless application. Console dispatching and system controls are strongholds of private systems, while some see administrative voice service as a commercial carrier specialty.

A data function such as automatic

It is becoming more feasible that utilities will choose commercial services for all but their most critical communications needs.

— Katherine Gomm

INTEROPERABILITY
FREQUENCY STANDARDIZATION
IP MIGRATION

VEGA IP-223

SIMPLIFIED

- VHF TO 800MHZ
- UHF TO P25
- CELLULAR TO RADIO
- AND EVERYTHING IN BETWEEN

The IP-223 is the most versatile radio controller available today!

AVAILABLE OPTIONS:
- Fleetsync and MDC1200 decoders
- POTS interface with caller ID

Compatibility with new radio frequency standards DOES NOT mean you have to scrap your existing equipment.

- Convert existing analog dispatch equipment to IP backbone
- Extend the reach and capacity of your communication infrastructure
- Control all radio functions
- Interface with telephone, satellite and cellular devices
- Transmit audio and control information via Ethernet connection
- Link multiple IP-223s with its flexible, modular design
- Interface with Vega IP dispatch consoles for a complete solution

(800) 752-7560 · www.vega-signaling.com

VEGA
By Telex Communications, Inc.

See Us at IWCE CIRCLE #32

meter reading (AMR) is a tossup, with both private and commercial options emerging in recent years. But as technologies evolve and merge, it is becoming more feasible for utilities to choose commercial services for all but their most critical communications needs.

Further, the perceived benefits of the respective systems change with utility customer demographics and service territory characteristics. As utilities develop strategies to upgrade their core wireless systems, they should carefully evaluate their total communications portfolio and look for opportunities where commercial services and private systems can complement and support each other.

All critical infrastructure entities can benefit from a structured evaluation approach that systematically establishes requirements and objectively identifies and evaluates options. Remember, system upgrades are driven by core requirements, not desired features.

When formulating a viable wireless upgrade plan internally, decision-makers should gain as much organizational support as possible, encourage participation from diverse groups, and validate requirements before using quantitative methods. It also is important to work closely with private system vendors to ensure that you purchase the right system; to test commercial service providers to make sure they can deliver as promised; to be open to hybrid approaches and new business models; and to seek outside help and advice as needed. And remember, even though an upgrade is mission critical, it must still pass a business case evaluation.

Of these principles, one in particular jumps out: Upgrades are driven by core requirements and not new features. At the end of the day, the core business requirements will be the determining factor when choosing between a private and commercial system.

So, are attitudes changing toward the use of commercial services for mission-critical functions? Among CI entities, not yet. We certainly can expect decision-makers to look at communications issues in a new and changing light in years to come. Aside from the obvious pull of new technical developments, other significant drivers for commercial services include downward pressure from state utility commissions on electrical rates and the profound impacts of industry deregulation. These "bottom line" drivers are countered by likely mandates on CI for greater reliability, however, as well as homeland security concerns.

In five years, we can expect to see a variety of hybrid business models,

Introducing
Two New MDC-1200
Plug-in Boards
Encode/Decode and
Display
Compatibility Issues Solved
Both the VME-100 and the VMDE-200 are capable of encoding MDC-1200, GE-STAR and DTMF signaling on individual channels in Vertex Standard radios. With VMDE-200 installed, incoming ID's will be displayed on the radio's LCD screen. User access to a 500-name alias table will assist you in sending a quick response. No wiring or separate programming is required.Call today for more information on the complete line of ANI products.
800-487-7184
sales@cimtechcorp.com
www.cimtechcorp.com
CIMARRON TECHNOLOGIES
Vertex Standard
Always Know Who You're Talking To™
Please Visit Us at IWCE Booth 12018
CIRCLE #33

ComLog™

digital voice recording systems

Just as no two fingerprints are alike, neither are customer requirements. Large enough to handle any size project, but small enough to carefully evaluate each customer's unique needs, CVDS has created a highly flexible and responsive environment. Each ComLog solution is closely managed to ensure that every project is tailored to fit your needs.

ComLog Voice Recorders are scalable from ***4 to 288 channels*** in various chassis sizes.

Each recorder comes equipped with a minimum 120GB hard drive (upgradeable, including RAID) and many archiving options to suit your needs; such as DVD drives, RAID, and external network drives (NAS).

Playback calls in less than half a second. Single-click instant recall.

T: 514.426.7879
F: 514.426.3511
www.cvds.com

CVDS

ComLog™
Digital Voice Recording Systems
dealership and reseller opportunities
U.S.A.
Canada
Europe

CIRCLE #34

but their core features will continue to be those that support the lifeblood of the business. Mandated reliability standards and CI protection measures may mean that private wireless voice and control systems will be even more important in five years, with much routine business communications routed to commercial systems. UTC also expects to see systems shared among more users across old "pool" lines to meet both cost-efficiency and emergency interoperability needs. ■

Katherine Gomm is a research manager with the United Telecom Council (UTC), a trade association based in Washington, D.C., that represents U.S. electric, gas, water utility, and energy communications networks. Gomm has 22 years of telecom equipment supplier experience.

Private Networking Prevails

By Rik Rasmussen

Commercial networks are not designed for mission-critical communications. While some decision-makers assume commercial networks are more economical than their private counterparts, others believe the "bells and whistles" they offer make them superior to private systems. This thinking could have disastrous consequences for public safety and the general public it protects.

Since the events of Sept. 11, 2001, we have witnessed heightened concern over the readiness of public safety agencies to respond to crisis events. While this attitude has translated to increased expenses for local and federal agencies, much of the funding is going to commercial enterprises, resulting in a substantial marketing effort by vendors to attract a share of these funds.

At least one commercial wireless provider has embarked on an aggressive marketing campaign to highlight its ability to provide interoperability and reliable communications for first responders.

While these commercial carriers offer feature-rich products and services that serve the needs of non-public safety users adequately, they have limited capabilities that seriously impede their use in the public safety arena.

Compare and Contrast

Some commercial wireless carriers provide a push-to-talk (PTT) feature similar to the dispatch function of public safety radios. The push button itself, however, is the only similarity the two services share.

Commercial wireless is a for-profit venture, while reliable public safety communications are a necessary expense for communities whose first priority is to ensure the general public's safety. The location of a fire station, unlike that of a commercial tower, is not based on potentially highest user volumes, but on quickest response times. Public safety communications systems are not built to support revenue demographics, but to provide total coverage for the public they serve, with a high degree of reliability and survivability. What apparently is not cost effective for a commercial provider is essential for a true public safety communications system.

Compare the experience of users who depend on commercial providers during hurricanes and ice storms with that of users with properly designed and maintained public safety radio systems. While commercial carriers often have outages for days due to loss of power and communications links, public safety systems are designed to continue operation in

Comparing a commercial wireless system to a private communications system is like comparing a fire truck to a U-Haul rental; each is great for its intended purpose, but one cannot do the other's specialized work.

— Rik Rasmussen

Complex, mobile wireless networks that connect all first responders and public safety agencies are critical during a crisis. Northrop Grumman is an expert at building these secure, high-speed systems that provide real-time transmission of voice, data and video. Our mobile wireless networks increase situational awareness, collaboration and response time across a vast array of agencies, jurisdictions and public safety personnel. We've demonstrated this expertise as prime contractor on the Ohio Multi-Agency Radio Communications System (MARCS), which has vastly improved emergency response and effectiveness. Mobile wireless communications without limits.

www.northropgrumman.com

©2004 Northrop Grumman Corporation

NORTHROP GRUMMAN

DEFINING THE FUTURE™

CIRCLE #15

these situations without interruption.

The primary weakness of commercial wireless is its inability to provide large group dispatch service. The architecture of commercial systems is geared to one-to-one communication such as phone and direct PTT calls. Public safety radio systems primarily operate in the large talk-group dispatch mode. An officer in trouble does not want to make a one-to-one call for help; he needs to alert his fellow officers of his situation. Group dispatch capability is crucial to public safety.

While some providers claim to be able to provide interoperability, it seems their definition of the term is different from that of the public safety community. During a crisis involving multiple agencies, interoperability offers all parties the ability to communicate among their various systems, using existing radios. The supplemental use of commercial systems may be of some value in such situations between specific individuals, but is of little value when coordinating multiple fire departments at a fire scene, possibly in an area of poor commercial system coverage.

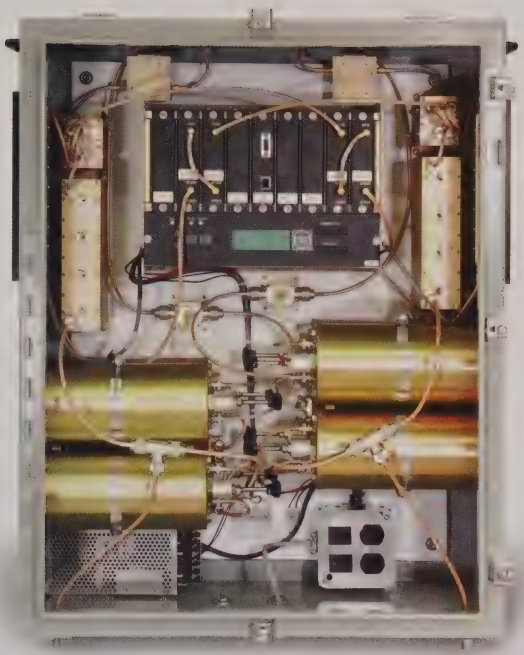
> ***We must be more vigilant than ever to ensure public safety has the right tools to do its work in the worst circumstances.***
>
> — *Rik Rasmussen*

Public safety agencies may benefit from supplemental use of commercial wireless providers for less critical communications; however, funds should not be exhausted on commercial services when they might be better spent improving the reliability of private systems.

Comparing a commercial wireless system to a private communications system is like comparing a fire truck to a U-Haul rental; each is great for its intended purpose, but one cannot do the other's specialized work.

Nationally, the public safety

See Us at IWCE, Booth 10032 CIRCLE #36



we spend more time in here.

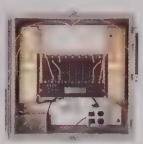
so you don't have to.

Engineering you can trust. Products you can depend on.

Reliable performance from your RF products means less downtime, less maintenance, and fewer headaches. Spend your valuable time doing your job instead of managing your equipment.

For over 60 years, Bird has been providing trusted RF products and backing them up with best-in-class service. Our customers trust our technology — from easy integration and set-up to dependable, worry-free performance.

We understand the demands of your world.



Signal Booster II
The innovative Signal Booster II delivers Public Safety grade dependability for RF applications in challenging environments.

SA Series
The range of rugged Site Analyzer products provides user-friendly test solutions for a number of RF applications.

BIRD® TECHNOLOGIES GROUP

RF Measurement and Management in Your World

BIRD® Electronic Corporation

TX RX SYSTEMS INC.

866-695-4569 | sales@bird-technologies.com | www.bird-technologies.com

See Us at IWCE, Booth 7041 CIRCLE #37

community is struggling with issues such as interference from commercial providers, spectrum shortages, infrastructure costs, interoperability, and increased demand for services. We must be more vigilant than ever to ensure public safety has the right tools to do its work in the worst circumstances. ■

Rik Rasmussen is radio system manager for the city and county of Durham, N.C., where he manages the communications maintenance division for an 800 MHz trunked radio system, 9-1-1 dispatch equipment, microwave system, vehicular radios, mobile data, and other electronic equipment.

Critical Communications Belong on Private Systems

By Kathy Watt

We all know the theoretical reasons why a public safety entity, or a private one for that matter, needs its own private system and should not trust critical communications to a public provider. Public systems are not built with the capacity to handle the heavy traffic that erupts during an emergency. And not all public antenna tower sites are equipped with backup generators, making them unusable during power blackouts, which often accompany storms and earthquakes. But this is just theory, right?

When an ice storm struck central Ohio in early January, 250,000 residents lost power. The impact to the public wireless system was very real. For example, in rural Darke County, the sole public cellular tower went down because it had no generator. Worse yet, the ice prevented work crews from reaching the site. While the public system was down for two and a half days, county public safety officials continued to have uninterrupted communications over their generator-supported system.

Generators also proved important during the hurricanes that battered Florida last year. Public cell sites, which lacked adequate generator backup, lasted only a few hours until batteries died. Public safety towers in the area did, however, have generator backup and ran for more than a week until commercial power was restored.

Enterprise radio systems serve day-to-day productivity needs. Yet they are also the first line of defense when an accident occurs.

— Kathy Watt

One of my colleagues recently told me of an official at his local sheriff's department who replaced the staff's cell phones with PTT cell phones as a backup to the regular two-way radio system. The delay when they pushed to talk was quite funny, my friend said. The first half of each sentence was cut off because they wouldn't wait for the permit-to-talk tone.

It wasn't quite as funny when tragedy struck during the Mountain Home Air Force Base Air Show in 2003. An Air Force F-16C "Thunderbird" plowed into the ground while 85,000 people watched from across the flight line. The pilot had failed to pull out of a dive but had ejected from the aircraft before it became a 200-yard-long fireball. No one in the audience was hurt.

In the frenzy that ensued, everyone pulled out their cell phone to call their family and say they were okay. My friend attempted to place calls on four different public networks for two hours straight — with no luck. Of course, the public safety radio systems worked like they do in any other emergency — perfectly.

What about private entities that depend on public radio systems? They are no strangers to critical communications. A fire in March 2004 at a student apartment building at

The *AFFORDABLE* high-performance Wide Area Network system.

CSI-Net is the low-cost, high-performance solution for a full spectrum of Wide Area Network applications. With flexible connectivity and scalable capacity, CSI-Net offers an affordable alternative to the considerably more expensive PassPort* system. The FLEX III universal controller provides access for up to 5,000 users at each site, and allows up to 999 different users to communicate across the network. Contact us today and see why CSI-Net offers the perfect balance of scalable performance and affordability.

CSI
Connect Systems, Inc.

1802 Eastman Avenue, Suite 116
Ventura, CA 93003
Tel: 805-642-7184
Email: sales@connectsystems.com
Web: www.connectsystems.com

© 2005 Connect Systems, Inc. *PassPort is a registered trademark of Trident Micro Systems. Cost comparison is an estimate only, and is based on comparable products. Product images are illustrations only, and do not represent actual PassPort products.

Virginia Commonwealth University, which damaged or destroyed 25 buildings in downtown Richmond, Va., caused pandemonium in the city. While 12 fire departments were called in and the 60 firefighters' radio systems performed well, the public wireless system quickly became overloaded and communications for some emergency responders ground to a halt during the crisis.

Enterprise radio systems serve day-to-day productivity needs of corporations, yet are also the first line of defense when an accident occurs. Safety in manufacturing plants, airport terminals, oil and gas refineries, seaports, and mining operations depends on reliable two-way radio systems that work in the middle of a crisis.

A couple of years ago, a major explosion occurred at a refinery near Cheyenne, Wyo. The company's internal fire department and EMS personnel, the Cheyenne Fire Department, and every public safety unit from the surrounding area responded, all using their own private radio systems. And it's a good thing they did; the major public communications system was monitored, and it was busied out for several hours during the incident response.

Some ambulance companies are switching from two-way radios to cellular phones. That won't happen in Wyoming. The state Health Department's Office of Emergency Medical Services feels so strongly about the issue that it is assisting ambulance companies with monies from Health Resources and Service Administration (HSRA) Bioterrorism Hospital Preparedness grants to acquire P25 equipment for the statewide VHF WyoLink system.

Additionally, it is replacing all base stations and remotes in all hospitals and clinics across the state so that they will be P25-compatible and compliant with WyoLink. That's a big step and a commitment of hundreds of thousands of dollars.

This type of determination among government, public safety groups, and private enterprise is critical to the health and welfare of the public. If an emergency occurs without proper communications, the consequences can be deadly. That is not a theory. It is reality. ■

Kathy Watt is president of Absolute Solutions, a dealer/operator located in Cheyenne, Wyo., and chairman of the Industrial Telecommunications Association's (ITA's) Council of Independent Communication Suppliers.

From the ground up
Whether you need an entirely new network, strategic upgrades, maintenance of existing systems, or assistance in planning and implementation, we can do it all. With over 20 years as a wireless integrator, MCS achieves excellence through commitment to customer satisfaction and technical expertise.
Services
Engineering, consulting, project management, installation, and maintenance on the following technologies:
• Simulcast Networks
• SCADA Networks
• Microwave Radio
• 802.11 Networks
• Mobile Data Networks
• BDA Systems
• Cellular/PCS
• Additional services
For complete information about our wide range of services, including 800 MHz rebanding support, please visit www.mcs-wireless.com.
800-353-2937
mcssales@mcs-wireless.com
Managed Communications Services, LLC
WIRELESS-DATA-VOICE INTEGRATORS
CIRCLE #39

CIRCLE #40

A Hybrid Approach

Michaël McShea and Richard Davis

Traditionally, government agencies at the federal, state, and local levels have operated private voice communications networks that are owned, operated, and controlled by each agency or jurisdiction. For the most part, these networks consist of two-way radio systems that allow users in well-defined groups to communicate with each other.

These private systems give the agency control of network architecture, design, and access, and the limited user base ensures capacity within the available spectrum. Unfortunately, most private systems offer limited coverage, which often does not fully meet user service needs.

For expanded geographic coverage, most agencies have turned to commercial cellular carriers to augment their private systems. This approach is clearly preferable to building expanded private radio systems that would cost billions of dollars to implement on a nationwide basis and be extremely costly to maintain. The end result is that most government agencies have a mix of portable communication devices that operate on these various public and private systems.

Without a common voice technology, users outside their private system's coverage footprint are required to carry multiple devices, moving from one to the other as they travel through a region. Even with these multiple devices, there is no interoperability among federal, state, and local systems. To address these issues, a hybrid public and private nationwide network is needed that enables seamless operations to the end user across public and private infrastructure, with a common architecture for federal, state, and local interoperability.

The Best of Both Worlds

A recent trend in the mobile data marketplace is to combine WLAN data systems such as 802.11 with wide-area systems such as GPRS networks. A user can seamlessly move between the private network and the larger public network using the same data applications and devices. This configuration is called a hybrid data network.

Similar to what has been done with 802.11 data networks, the public/private concept also can be extended to private cellular voice and mobile data networks, allowing users to roam seamlessly from private radio networks to public commercial networks.

The hybrid voice network could be deployed with existing and planned cellular voice technologies. This architecture would involve building local private communication

A hybrid public and private nationwide network is needed that enables seamless operations to the end user across public and private infrastructure, with a common architecture for federal, state, and local interoperability.

For High Quality Two-Way Radio Antennas & Batteries

Rely on the TUF DUCK!

Since the introduction of the "Tuf Duck" antenna twenty-five years ago, Centurion antennas and batteries have become the standard for two-way radio applications. Centurion products have earned a reputation for rugged reliability and long life despite demanding use and harsh environments.

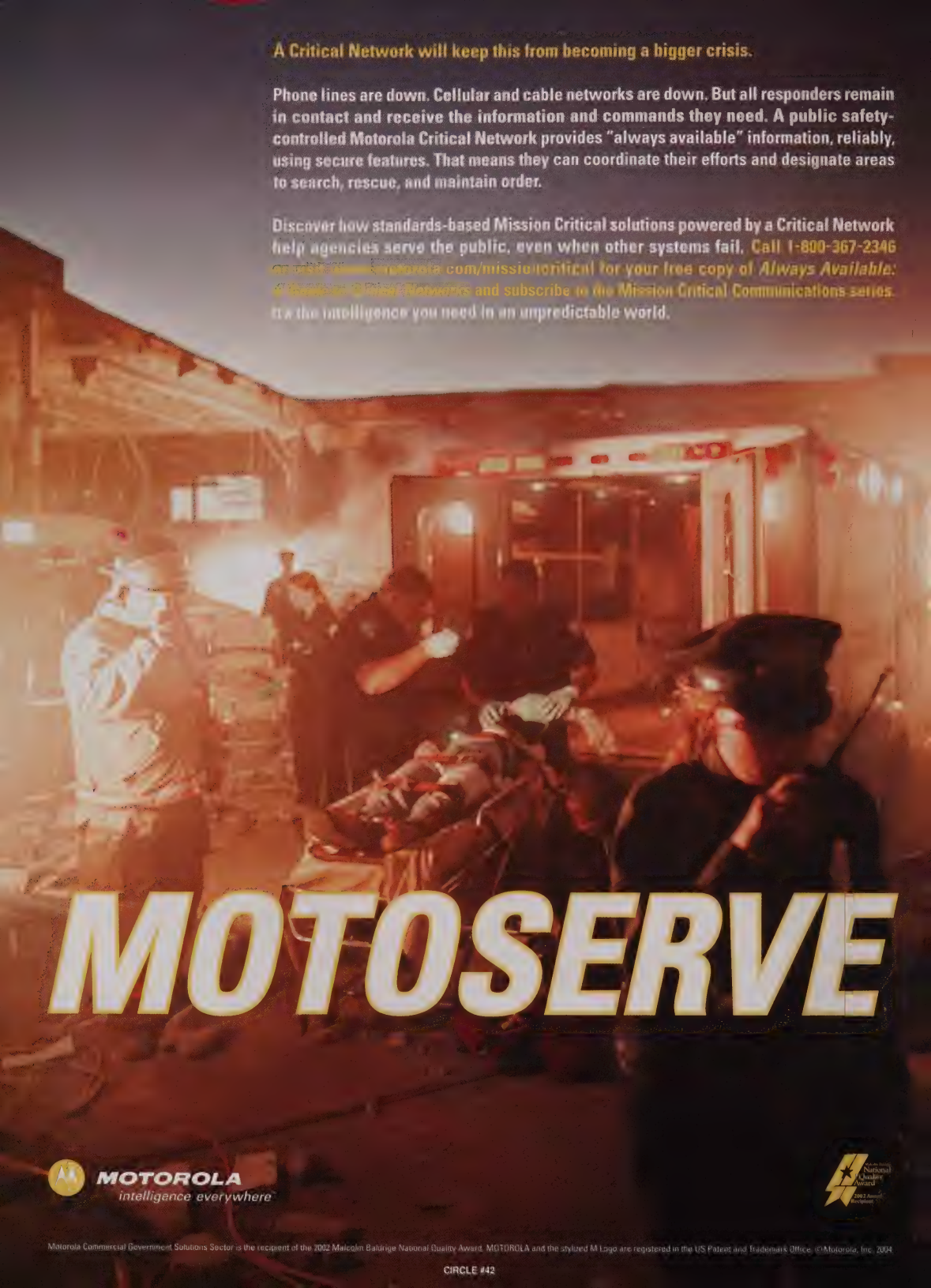
Centurion also offers a full line of wireless device, telematics, in-building antennas and power products to complete your communications hardware needs. To learn more about Centurion's antenna and battery technologies, please visit **www.centurion.com**.

CENTURION™

North America: 800.228.4563
International: 402.474.0706
www.centurion.com
sales@centurion.com

See Us at IWCE CIRCLE #41

CENTURION ANTENNAS & BATTERIES


A Critical Network will keep this from becoming a bigger crisis.
Phone lines are down. Cellular and cable networks are down. But all responders remain in contact and receive the information and commands they need. A public safety-controlled Motorola Critical Network provides "always available" information, reliably, using secure features. That means they can coordinate their efforts and designate areas to search, rescue, and maintain order.
Discover how standards-based Mission Critical solutions powered by a Critical Network help agencies serve the public, even when other systems fail. Call 1-800-367-2346 or visit www.motorola.com/missioncritical for your free copy of Always Available: A Guide to Critical Networks and subscribe to the Mission Critical Communications series. It's the intelligence you need in an unpredictable world.
MOTOSERVE
MOTOROLA
intelligence everywhere
National Quality Award

Motorola Commercial Government Solutions Sector is the recipient of the 2002 Malcolm Baldrige National Quality Award. MOTOROLA and the stylized M Logo are registered in the US Patent and Trademark Office. ©Motorola, Inc. 2004

CIRCLE #42

nodes in critical locations or areas such as government campuses, airports, military facilities, or even hospitals. Costs are lower compared to those of a national private network simply due to the fact that the private voice network exists in smaller geographic nodes. This means an agency does not need to build out a statewide or national private footprint. Mission-critical functionality can be provided at key locations within the cellular national footprint.

In addition to the obvious savings in upfront infrastructure costs, this hybrid architecture offers multiple benefits when compared with building a separate private national network or just using a public network:

Reliability. The private nodes can be isolated to operate independently from the public cellular network. The private node would be connected through a private, mission-critical switching network.

Capacity. The hybrid public/private network would allow capacity control at the private network nodes where voice capacity is critical, avoiding commercial cellular system capacity constraints and call blocking due to PSTN congestion.

Control. Access and network design control of the private nodes would still remain in the hands of the agency and not with the public cellular carrier.

RF coverage. RF coverage area can be specifically designed to support the extended coverage needs of mission-critical users within a local or campus-based private node.

Backup network. In the event a private system node goes down, users could seamlessly revert to the public network.

Combined voice and data. This approach could be utilized for both voice and data, greatly reducing the number of end-user devices and taking advantage of commercially driven voice and data convergence trends.

Considering existing technologies, one very compelling scenario would be to combine a private cellular (GSM or CDMA) radio service with a national commercial service. The selected cellular technology would have to offer operational-grade features such as two-way radio functionality and cellular interconnected calling capability through the PSTN.

The hybrid service would be comprised of private transmitter locations configured for mission-critical operation and connected through private cellular switches. When the end user leaves the private campus environment, the communication device would roam from the private node to the national wide-area network. Of course, this requires more capable

240% MORE CAPACITY
AND 35% LIGHTER

Besides being the highest capacity, lightest weight Li-Ion battery for the Motorola XTS-3000 and XTS-5000 radio, the new 4000 Plus Power System lets you charge the battery and talk at the same time.

4000 Plus Power System

- Light weight Li-Ion battery weighs only 8.6 oz
- Highest capacity Li-Ion battery rated at 4000 mAh
- Available as a vehicular charger, AC/DC charger or 6-bank charger

SEE THIS SYSTEM, ONLY FROM MULTIPLIER, AT IWCE, BOOTH #7049

Multiplier®
1-800-642-2424
ISO 9001:2000 CERTIFIED

CIRCLE #43

A recent trend in the mobile data marketplace is to combine WLAN data systems such as 802.11 with wide-area systems.

"smart" user devices than exist today, but there is precedent in the 802.11 phones currently being produced in the commercial market. Solutions will be required for intelligent handoffs and the ability to maintain encrypted VPNs while transitioning through these environments.

Common Interoperability Architecture

A nationwide hybrid system architecture described above will not exist for many years and likely will never envelop state and local communications networks. This reality brings forth the need for another key element for a nationwide architecture: a common interoperability architecture that enables the internetworking of existing wireless voice and data systems regardless of technology, frequency, or standards incompatibility.

The most effective way to meet the interoperability challenge is with an architecture that translates voice from each unique system into a common IP-based format. This approach enables base system-to-base system communications within federal, state, and local domains regardless of technologies in use, while providing a common interface to the nationwide hybrid network previously described.

VoIP standards would enable users on different networks and technologies to define on-the-fly, event-driven, software-defined networks.

By utilizing existing commercial infrastructure and selectively building private communication nodes, a reliable and affordable network topology emerges. Choosing the same technology for the public and private nodes has the added benefit of lower device costs. A robust VoIP-based interoperability solution completes the picture and extends the nationwide network to existing communication systems at federal, state, and local levels. ■

Michael McShea is senior director of global product management for ARINC Network Solutions. Rich Davis is currently product director for ARINC's private iDEN service offering.

CIRCLE #44

Times LMR®

one source – all the pieces

The LMR® product line is more than just the best low loss, flexible cable available — we provide you with all the right pieces for a complete RF interconnect system. From LMR®-DB cables with a 10 year warranty for outdoor installations to LMR®-FR and LMR®-LLPL cables to meet the requirements of indoor installations, to UltraFlex cables for installations in tight spaces, there's an LMR® cable just right for your application. Our innovative, high quality, "EZ" non-solder connectors match LMR® cables perfectly and are the quickest, most reliable connectors for field installation. Times provides a complete line of easy-to-use tools for quick and reliable attachment of connectors on-site. A full range of grounding kits, hangers and feed-thru's lets you finish the job professionally. For your most critical or high volume applications, buy LMR® cable assemblies built to your specifications. And to help you put all the pieces together right, we offer unequaled training and technical support. Get all the benefits of our complete package from quality products to total product support from Times Microwave Systems. Let us put all the pieces together for you — Contact us!

TIMES MICROWAVE SYSTEMS
A Smiths Group plc company

ISO 9001 SGS

World Headquarters: 358 Hall Avenue, Wallingford, CT 06492 • 203-949-8400, 1-800-867-2629 FAX: 203-949-8423
International Sales: 4 School Brae, Dysart, Kirkcaldy, Fife, Scotland KY1 2XB UK • +44(0)1592655428 FAX: +44(0)1592653162
www.timesmicrowave.com

See Us at IWCE, Booth 3025 CIRCLE #45

Don't Rule Out Either Option

By Alan Shark

The private vs. commercial network debate is nothing new. Rather, it is an ongoing discussion that changes with new technology advancements, tighter local budgets, and more demanding criteria and applications. The need for more reliable mission-critical communications has never been greater in terms of reliability, coverage, and dynamic applications.

On Sept. 11, 2001, both public sector communications and commercial systems failed to stand up to the task. Yet through tragedies we have the opportunity to learn and adjust. Of course, there is no one answer or paradigm that will fit every locality's needs. Having received some valuable input from PTI members, I feel I can offer some useful commentary relating to private and public control of mission-critical systems.

Proponents of commercial systems argue that they often can get new technology faster. And when it's time to upgrade, the locality won't be stuck with worthless technology. Proponents believe such systems could be shared with other divisions or jurisdictions, reducing the per-unit cost. Also, many jurisdictions lack the expertise to stay on top of all the technological developments that seem to be coming out at a faster and faster rate these days.

Having an outside vendor responsible for technology deployment and maximizing efficiency is certainly viewed as a plus. Relying on an outside provider for these services also gives the jurisdiction someone else to point the finger at when there's a problem. And usually an outside provider has more expertise and is better equipped to build and maintain the system — especially when it comes to managing a 24/7 network. A commercial network also makes a great deal of sense for some smaller jurisdictions that don't have the resources, staff, time, or expertise to maintain their own private system.

But along with the pros are corresponding cons. Local jurisdictions feel that they have less control of their own systems, which also can mean less accountability. Having a guarantee of priority service does not mean one will get it in an emergency. But then again, having an internally managed system also can mean that a jurisdiction must live with outdated, legacy equipment in order to depreciate it fairly.

I believe that no one system can or should meet all jurisdictional mission-critical needs.

— Alan Shark

Historically, managing critical infrastructure has been an area in which the public sector has excelled; however, we did learn some lessons from the recent hurricanes in Florida. Specifically, 800 MHz systems were more reliable than commercial networks because governments invested in hardened sites with alternative power systems. Investments also were made in specialty antennas, which enabled them to withstand hurricane-force winds. Commercial systems experienced overloaded circuits, and systems lacking alternative power were hard hit.

Having been part of this debate from both sides over the past 15 years, I believe that no one system can or should meet all jurisdictional mission-critical needs. Instead, we need to develop strategic plans that include multiple layers and redundant networks. While I suspect economics and market forces will further drive local jurisdictions to turn to public mission-critical networks and systems, we must not lose sight of the need for much greater resources for staff training and development in mission-critical technology and applications. We need additional staff who can better plan and provide critical thinking to assess internal needs, create RFPs, and manage projects.

Local officials must have the training and knowledge to plan for updated mission-critical systems, as well as the skills necessary to assess and evaluate internal needs and vendor proposals. Local jurisdictions need the in-house capability regardless of whether they ultimately choose to go public or commercial. On the larger scale, local jurisdictions require more collective research and demonstration projects to be equipped to meet the challenges and expectations that mission-critical communications imply. ■

Dr. Alan R. Shark, D.P.A., CAE, is executive director of the Public Technology Institute (PTI) in Washington, D.C. Formerly, Shark was president and CEO of the American Mobile Telecommunications Association (AMTA).

The POWER to PROTECT

- Waterproof
- PROBAND Antenna Options
- Programmable Volume Control
- Intrinsically Safe Options
- Full Accessory Line
  - Earphones
  - Headsets
  - Throat Mics

Stone Mountain's new PROBAND antenna series continues our legacy of innovative, high quality products. The PROBAND 800 MHz antenna stands less than 2" tall, yet delivers superior RF performance.

Our engineers redefined conventional thinking by incorporating Printed Circuit Flex Film Technology (PCFFT), allowing us to literally "shrink" the antenna profile without sacrificing Tx/Rx quality.

Designed exclusively for the hardworking professional and assembled and tested in the U.S.A to the very highest standards of excellence, Stone Mountain speaker microphones are rugged, dependable and built to last.

Stone Mountain
Innovation... Quality... Passion

T: 888.244.9306 F: 540.297.2843

sales@stonemountainltd.com
www.stonemountainltd.com

See Us at IWCE, Booth 13009 CIRCLE #46

HOT Opportunities for DEALERS

Wireless Broadband • Homeland Security
In-Building Coverage • 800 MHz • Two-Way Radio

By Jeffrey Elliott

As the original high-tech equipment suppliers, two-way radio dealers have always taken great pride in their work. The frontrunners of years past boasted a unique knowledge of RF-based products and technologies, foreign to most everyone else, ensuring their place as a valuable asset to business, industry, and public safety operations. Companies were founded on relationships sealed over a handshake and a cup of coffee, and many of the same customers and technologies still exist today.

A new era has rapidly descended on the radio dealer, however; one no longer characterized by radio sales, repair services, and strong relationships alone. With the lingering effects of a soft economy, increased competition from commercial wireless carriers offering push-to-talk (PTT) voice and wide-area data services, shrinking margins on product sales, and a declining need for equipment service and maintenance, dealers have lost important streams of revenue.

"Radios have become more of a commodity business," says Steve Crout, president of Denver-based Triple C Communications, a two-way radio dealership founded by Steve's father Lee in 1965. "If I had to make a living just off hardware sales, I'd starve."

According to *MissionCritical Communications*' informal "Snapshot Survey" of approximately 200 readers who classify themselves as two-way radio dealers, 35 percent indicated that business for them was below average during 2004, with 29 percent reporting that 2004 was an average year for business. (See Figure 1 on page 64.)

While some dealers have perhaps reluctantly acknowledged that their best days in business may be a thing of the past, a majority are not conceding their livelihood to the competition or an economy struggling to gain ground. Despite last year's overall lackluster results, most dealers remain optimistic about the future. Forty-five percent of those responding to our survey expect their business to expand in 2005. (See Figure 2 on page 64.)

The reality is, however, that two-way radio sales alone will not cut it anymore for the average dealership, which is why businesses such as Triple C have adapted their competencies to meet the demands of a changing marketplace. For Crout, it means becoming more of solutions provider — sales, installation, and service — as opposed to simply tendering equipment.

Other dealers have found a niche in wireless broadband, while still others are taking advantage of the recent 800 MHz rebanding order to improve their bottom line. The common thread these dealers have is the insight to discover the opportunities available in their area. Dealers

Widest range of cost efficient work force tools

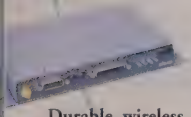
High performance cellular asset management

In-vehicle workflow printer

Complete Fleet Business Solutions

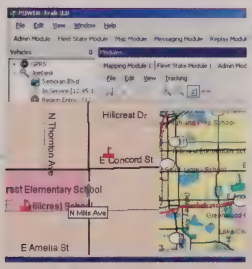
www.ceswireless.com

Secure in-vehicle magnetic card reader



Durable, wireless asset management

Industrial or commercial DTMF microphones



PC/client or web based fleet management software

TEAM PLAYERS...

When you want your people to work together, look to the CES Wireless fleet management products. Just like your star players they offer top performance on their own or as part of a team. In vehicle products are compatible with popular wireless systems and radio manufacturers devices. Software is available as single or multiple client, or web based. Products are also available from select Motorola re-sellers worldwide.

CES WIRELESS TECHNOLOGIES

looking for future success must be innovative, flexible, and most of all, well-educated on emerging technologies and ever-changing regulations.

Here are five hot opportunities in which today's two-way radio dealer can leverage their existing expertise in RF, pool of potential customers, and marketing savvy to improve their business.

Figure 1
What was the radio dealer business like for you in 2004?

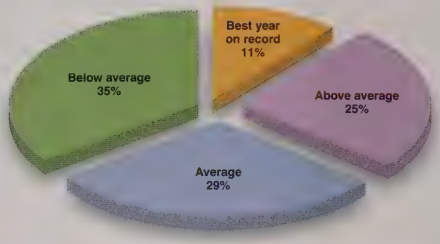
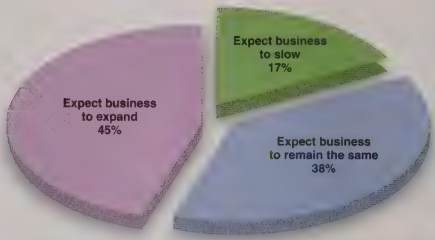


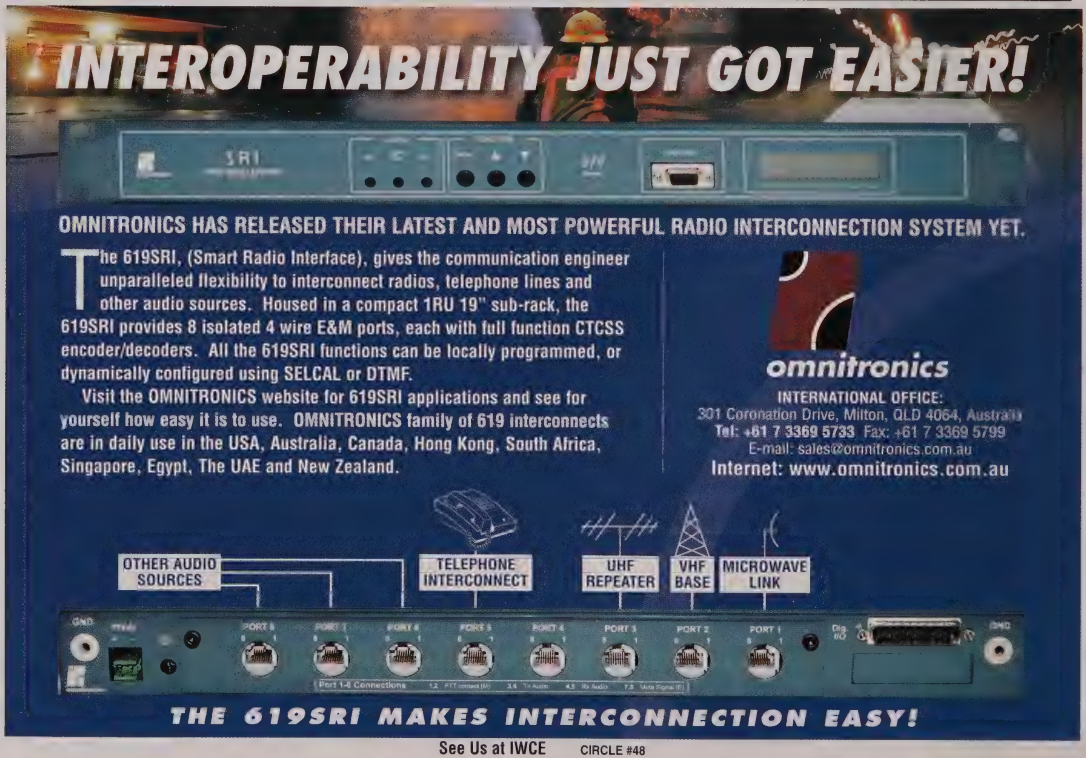
Figure 2
What is your outlook for 2005?



Opportunity 1: Wireless Broadband

Many dealers looking for opportunities to not just survive, but thrive in this new era of communications are considering wireless broadband. High-speed data is no longer a technology of the future. Fifty-five percent of respondents to our survey indicated they were experiencing greater demand for broadband data applications. (See Figure 3 on page 65.)

Texas Communications has provided two-way voice and data communications for 30 years. With many of the Abilene-based dealer's customers asking for high-speed data services, the company decided to capitalize on the opportunity. After some negative experiences installing and maintaining 802.11 wireless LAN equipment for customers, however, it found a solution in Motorola's Canopy wide-area broadband data technology. Soon, a combination of the right equipment and market demand led Texas Communications into the wireless Internet service


INTEROPERABILITY JUST GOT EASIER!
OMNITRONICS HAS RELEASED THEIR LATEST AND MOST POWERFUL RADIO INTERCONNECTION SYSTEM YET.
The 619SRI, (Smart Radio Interface), gives the communication engineer unparalleled flexibility to interconnect radios, telephone lines and other audio sources. Housed in a compact 1RU 19" sub-rack, the 619SRI provides 8 isolated 4 wire E&M ports, each with full function CTCSS encoder/decoders. All the 619SRI functions can be locally programmed, or dynamically configured using SELCAL or DTMF.
Visit the OMNITRONICS website for 619SRI applications and see for yourself how easy it is to use. OMNITRONICS family of 619 interconnects are in daily use in the USA, Australia, Canada, Hong Kong, South Africa, Singapore, Egypt, The UAE and New Zealand.
omnitronics
INTERNATIONAL OFFICE:
301 Coronation Drive, Milton, QLD 4064, Australia
Tel: +61 7 3369 5733 Fax: +61 7 3369 5799
E-mail: sales@omnitronics.com.au
Internet: www.omnitronics.com.au
OTHER AUDIO SOURCES
TELEPHONE INTERCONNECT
UHF REPEATER
VHF BASE
MICROWAVE LINK
THE 619SRI MAKES INTERCONNECTION EASY!
See Us at IWCE CIRCLE #48

provider (WISP) business, with respectable prosperity.

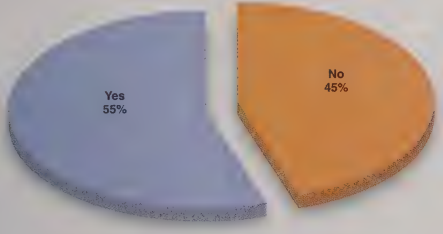
The company's key success was in its ability to find a niche market and stay the course. It wasn't about to take on the large high-speed data provider offering cable or DSL service, so it focused on the "low-hanging fruit," according to Texas Communications CIO Lewis Bergman. "We target areas where there is no broadband already."

But the WISP business is extremely competitive and not one for every dealer. In fact, the majority of those in the wireless broadband space are selling and installing equipment for more traditional services such as remote monitoring.

Petroleum products supplier Teppco, which operates a pipeline network from west Texas to New York state, implemented the Canopy broadband technology for video surveillance of its remote, unmanned pipeline facilities. Teppco brought in a number of local communications partners for the project, including Houston-based Able Communications, which provided the closed circuit television (CCTV) software.

While dealers are well positioned to take advantage of the demand for wireless broadband service, they must do so with caution. "The good news is that so many traditional two-way customers are great prospects for broadband services," says Mark Landiak, president of Corporate

Figure 3
Are you experiencing greater demand for broadband data applications?



Dynamics, a Chicago-area firm that provides consulting and sales training services for dealers. "The bad news is that dealers still must develop a certain level of comfort and competency with IT."

Landiak encourages two-way dealers to get up to speed with the emerging trend of convergence between RF and IT networks. "More and more IT directors are controlling decisions that involve RF communications," he says. "The more that happens, it will be those who can 'talk the talk' with the IT managers that are going to be in a position to build a total solution."

Landiak's advice: Consider hiring outside the RF community to meet your need for IT expertise. "If your existing sales team is not willing or able to take on a serious learning curve, they may uncover some good sales opportunities only to wind up spending a large amount of time on the sale and lose it to a more savvy dealer or an IT consulting firm." →

UNIROSS
The rechargeable specialists

YOUR #1 CHOICE FOR
PORTABLE MOBILE RADIO BATTERIES

Specialists in LMR battery manufacturing
- Comprehensive range of replacement LMR batteries
- 35 years in the LMR battery market
- Unrivalled design and manufacturing
- Rigorous quality standards - ISO9001:2000 accredited

Now Available in the USA and Canada
Meet us at IWCE Booth # 8062

Bay Batteries
A Uniross Strategic Business Partner
402 Beards Dock Crossing
Annapolis MD 21403
877-UNI-BATT
(877-864-2288)
jmoon@baybatteries.com

Uniross Batteries
Corporate Offices
52D Cumming Park
Woburn MA 01801
866-4-UNIROSS
(866-486-4767)
Ed.McCarthy@Uniross.com

In Canada call 800-267-8895

www.uniross.com

CIRCLE #49

Opportunity 2: Homeland Security

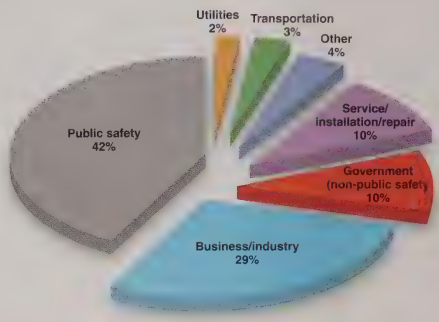
Public safety provides the majority of business for the traditional land mobile radio dealer. According to our Snapshot Survey, 42 percent of dealers indicated that public safety provides most of their business. The next-closest category was business and industry, which 29 percent of respondents indicated was their primary business. (See Figure 4 on this page.)

The potential for dealers to capitalize on the increasing demand for public safety communications equipment, particularly interoperability solutions, is monumental, according to Carroll Hollingsworth, a manufacturers' representative with D H Marketing in Lago Vista, Texas. "It's a huge opportunity and only getting bigger."

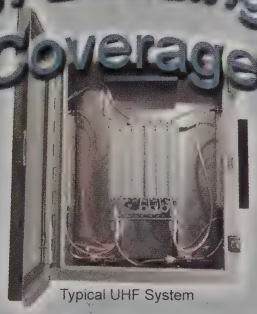
However, a problem still lies in the public safety community's ability to spend the federal money promised them for interoperability and other communications solutions in the name of homeland security. Though much of those funds have been delivered to states and municipalities, indecision on how best to distribute the money has much of it locked in bureaucratic struggles.

Will 2005 be the year that federal grant funds for homeland security funds find their way out of government coffers en masse and into the hands of dealers and manufacturers who can provide the solutions public safety agencies need? The dealer community remains hopeful. And the best advice is to prepare for opportunities now by thinking out of the box that is their shop, and into the field, where their solutions will be used.

Figure 4
What industry provides most of your business?



Comtex Communications in Waxahachie, Texas, is one dealer whose forward thinking has landed it in the middle of a significant homeland security opportunity. Capitalizing on public safety's immediate needs for interoperable communications at the scene of an incident, Comtex is outfitting trailers with the radios, antennas, and inter-

EMR corp.
Celebrating 25 Years Est. 1980
EMR corp.
EMR Corp., 22402 N. 19th Ave. Phoenix, AZ 85027 Tel: 623-581-2875 Toll: 800-796-2875
Fax: 623-582-9499 Web: emrcorp.com E-mail: info@emrcorp.com
PAST HISTORY IS THE BEST PREDICTOR OF FUTURE RESULTS
WE'RE AN ENGINEERING COMPANY WITH A MISSION TO PROVIDE UNPARALLELED CUSTOMER SOLUTIONS & SUPPORT
WE OFFER HIGH PERFORMANCE SOLUTION BASED PRODUCTS
In-Building Coverage

Typical UHF System
- Type Accepted For: VHF, UHF, 800 & 900 MHz
- Custom Designed Filtering
- Test Proven Ultra Reliable
- Automatic Gain Control (AGC)
- Lockable NEMA 12 Cabinet
- Adjustable System Gain
- Customized and/or Multi-Band Systems
- Compatible With & Easily Integrated Into Fiber Optic Distribution Systems
- Complete Line of Distribution System Support
PRODUCTS FROM 30 MHz to 2.8 GHz:
Intermod Control Devices
Cavity Resonators
Duplexers
Low Loss TX Combiners
Hybrid Combiners
Simplex Combiners
Channel Keeper Finder
Site Monitoring Equipment
Transmitter Multicouplers
Tower Top Multicouplers
Signal Enhancement Prod
Amplifiers
Antennas
See Us at IWCE CIRCLE #50

connection gateways such as the JPS ACU-1000, and selling them as mobile command posts.

Comtex has sold several mobile units, with its most prominent customer being the Alamo Area Council of Governments (AACOG) in San Antonio, which represents a 12-county region in south-central Texas. "In a time when many states and government entities are being criticized for mishandling their homeland security grant money, this is truly a success story," Hollingsworth says. "Every dealer that has public safety customers should get into this area."

Opportunity 3: In-Building Communications

Interoperability solutions and wide-area networks are not the only areas in public safety that dealers can be optimistic about, nor are they for every dealer. Triple C's Crout has all but avoided the traditional public safety business in favor of solutions on a smaller scale.

In-building communications is a well-documented weak link in the public safety communications chain, and an increasing number of municipalities are requiring large-building owners to provide coverage for public safety communications. In certain cities such as Denver, in-building coverage plans are required for new construction permits or large-scale improvements.

In order to diversify his business, Crout has attacked the in-building communications market with great success.

Though much of those funds have been delivered to states and municipalities, indecision on how best to distribute the money has much of it locked in bureaucratic struggles.

We DEFINE Communications!
Communications (kə-myōō'nĭ-kā'-shənz) n. 1. The ability to effectively and reliably convey information between two or more specific locations. 2. See GAI-Tronics®.
RF Call Box (RF: abbr. Radio Frequency kôl bŏks) n. 1. Wireless Communications for Public Safety, Recreation, Parking, Transportation, and Gate Entry. 2. See GAI-Tronics®
EMERGENCY
EMERGENCY
GAI-TRONICS®
A Hubbell Company
Toll Free 800-492-1212 www.gai-tronics.com

See Us at IWCE, Booth 6061 CIRCLE #51

"In the last two or three years, we've gone from doing one in-building bidirectional amplifier system per year to one per month."

In-building communication is one emerging opportunity that's tailor-made for the two-way radio dealer. Because it's RF driven, special considerations must be given to power levels, equipment locations, and coverage so that it does not create interference with other RF systems. "You need a specific knowledge of RF design and engineering," Crout says.

Nextel's brainchild turned into a beast for the FCC, public safety, commercial carriers, and everyone else associated with the 800 MHz band.

Opportunity 4: 800 MHz

The FCC decision to move 800 MHz users so cellular-like commercial wireless systems are separated from public safety and other private wireless users was one of the most difficult issues the commission has ever faced, according to former chairman Michael Powell. Nextel's brainchild turned into a beast for the FCC, public safety, commercial carriers, and everyone else associated with the 800 MHz band. It is one big headache for those involved, and that's good news for dealers.

While the details have largely been sorted out, nearly everyone in the land mobile community is scrambling for a partner, whether it be a consultant, lawyer, or technician qualified to retune radios.

The 800 MHz rebanding process offers dealers a few

Introducing Crescend's Newest Line of Power Amplifiers

- Broadband Performance
- Excellent Reliability
- Closed Loop Power Control
- VSWR Protection
- Thermal Protection
- Remote Monitoring Capability
- Full 3 Year Warranty

Crescend TECHNOLOGIES

920 E. State Parkway
Schaumburg, IL 60173
800-USA-MADE
www.CresendTech.com

See Us at IWCE CIRCLE #52

Sine-wave Inverters
& Frequency Converters
(Single & 3-phase)
for Demanding Applications
Absopulse Electronics offers an extensive range of custom and standard AC power conversion products for harsh-environment applications. We provide cost-effective solutions for almost any input/output and mechanical configuration requirement, even at low quantities.
rugged, compact, field-proven designs
EMI filtering to meet EN55022 Class B
50Hz, 60Hz and 400Hz output frequencies
wide operating temperature ranges
immunity to shock, vibration, humidity, moisture
turnkey systems in 19" or 23" racks
chassis-mount units
Transfer switches also available
ABSOPULSE
Tel: (613) 836-3511 Fax: (613) 836-7488
E-mail: absopulse@absopulse.com
www.absopulse.com
Also designers & manufacturers of AC/DC Power Supplies & Battery Chargers, DC/DC Converters, Power Systems in 19" & 23" racks, DC-Input Backlight Inverters & Laboratory Power Supplies.

CIRCLE #53

opportunities to lend their services and perhaps sell a little equipment, but it won't be a boon for the dealer community as a whole. "No one is going to make a killing," says Mark Crosby, president and CEO of the Industrial Telecommunications Association (ITA). "This process is going to be managed very carefully." Keep in mind that Nextel is only required to pay for retuning costs or equivalent facilities and equipment, should a radio not be able to be retuned or replaced. And they have admitted to stockpiling 800 MHz radios that they plan to distribute to users who cannot retune their equipment.

Although there's the outside chance a public safety agency or other user will use this opportunity to upgrade an entire system or change out an aging radio fleet at its own expense, the greater opportunity for dealers will reside in simply supporting their customers through the process. Dealers should educate themselves thoroughly on the issues so they can, first and foremost, be a resource to their customers.

"What a golden opportunity to say, 'I'm here to help,'" Crosby suggests. "Even if your customer is sitting perfect, call on them anyway to let them know they're OK." That single event has value and may be an invitation to more business down the road.

Opportunity 5: Two-Way Radio

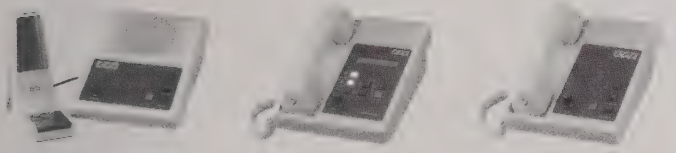
Is two-way radio truly a "hot" opportunity for dealers? You bet. For many users that require reliable voice communications, there is still no replacement for the two-way provider's core competency: wide-area dispatch radio.

"Two-way radio will not be replaced by new technology in the near term," says Kip Williams, vice president of business development for communications equipment distributor Tessco Technologies. Williams is working with a manufacturer to provide remote area security via a trunked radio system. With a low-cost transmitter operating on two-way frequencies, site operators, for example, can remotely open or close security gates, arm window alarms, and monitor communications equipment.

The fact that a dealer stays true to two-way radio will be an asset when they look to get into new opportunities. "A lot of two-way dealers have a loyal customer base that they've been dealing with for years," Williams says. "As their customers are looking for more than trunked two-way radio, they will first go to the people they trust." ■

Jeffrey Elliott is editor of *MissionCritical Communications* magazine. Contact him at jelliott@radioresourcemag.com.

Need remotes? Call Us



CPI manufactures a complete line of DC, Tone, Local Extension, Multi-Channel, and Multi-Line remotes and termination panels for most radio systems.

The CPI line of Multi-Channel remotes include systems for the Kenwood -80 (TSR412/TSP402) and -90 (MCP411/MCP401) series and many Motorola models including the CDM1550(LS), (MCR211A/MCP200C) and the M1225 Series. For additional information on the complete CPI line of products please call us or visit our website.

CPI

941 Hensley Lane • Wylie, TX 75098
Phone: (800) 869-9128 (972) 429-7160
Fax: (972) 429-7165
www.cpicomm.com

See Us at IWCE CIRCLE #54

Interoperability & Radio over IP Solutions, Without the Red Tape

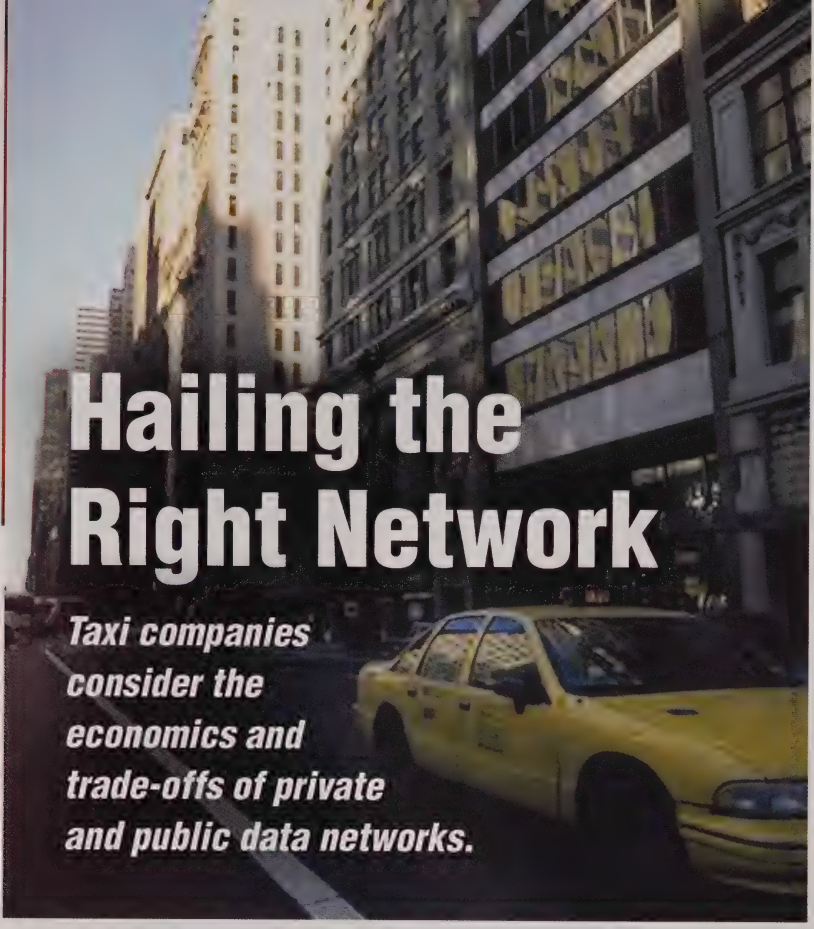
With budgets disappearing, deadlines fast approaching and liabilites looming, **let Catalyst Communications Technologies be your Number One Source** for radio interoperability without the hassles of red tape and costly overhead.

Catalyst is redefining the perception that safety is not affordable, dependable and flexible -- call us today!

catalyst
communications technologies

contact us at: 434.582.6146
www.catcomtec.com

See Us at IWCE CIRCLE #55



Hailing the Right Network

Taxi companies consider the economics and trade-offs of private and public data networks.

By Graeme Harfman

LA Taxi Co-Op of Los Angeles, Calif., is the largest driver-controlled taxi fleet in the United States, with 750 taxis. The company installed a computerized dispatch system in 1989. When it came time to upgrade to a next-generation advanced dispatch system in 2004, it chose to build out its existing private network. But with the broad coverage available from public data networks such as GPRS, CDMA, and iDEN, one wonders: What is the best option for companies like LA Taxi Co-Op today?

The Costs

Taxi companies require consistent, pervasive radio coverage. For LA Taxi Co-Op, ensuring coverage across Los Angeles' large, rolling geographical area required a complex radio infrastructure. In addition, like many established companies, LA Taxi Co-Op purchased most of its infrastructure years ago, and it had already been amortized off the balance sheet. Recurring expenses are typically limited to equipment maintenance, radio tower and telephone line leases, and radio service contracts.

To compare the cost of private service with public data network service, one must roll the private mobile radio costs into a monthly expense. First, divide the annual infrastructure amortization cost by 12 months and add the recurring monthly expenses. Then, divide this monthly fee by the size of the fleet to determine the monthly cost per vehicle, since public carriers charge on a per-taxi basis.

Commercial carriers offer national data networks that cover the majority of North America's populated areas; therefore, taxi companies that use their services do not incur infrastructure costs such as tower site leases, radio equipment maintenance, or telephone line leases. Public data carriers charge for network access in addition to a monthly fee per taxi, however.

Commercial carriers offer many different monthly pricing options for data customers, and the pricing varies significantly by city, depending on market competition. Prices range from a flat rate per megabyte of data used to a flat rate for a maximum amount of data usage.

In contrast, taxi companies with a private mobile radio infrastructure in place have a fixed monthly expense and a wide range of data bandwidth available to address their needs. As a result, larger fleets are more inclined to use private networks, while smaller fleets tend to use public data networks to avoid large infrastructure costs.

Newton Whalley Hi-Way Taxi Ltd. of Surrey, British Columbia, for example, decided to outfit its 50-vehicle taxi fleet with a dispatch system that operates over Rogers Wireless Communications' GPRS wireless data network. "We ran the numbers to build a private mobile radio system and to sublease a private mobile radio system. In the end, the use of a wireless data service is the most cost-effective way for us to use a computerized dispatch system," said company operations manager Dale Gosal.

Technology Trade-Offs

A private system can send a message to the entire fleet simultaneously, a feature called "broadcasting." Broadcasting is extremely beneficial to taxi dispatch as data on jobs, stands, and zones can be relayed to every taxi in the fleet in a single message. This information is critical for taxi drivers who use the data to determine which areas have the most jobs.

Commercial data networks do not offer the broadcast feature, and dispatchers must call every taxi individually to send the same message. This

AS A GENERAL RULE ...

larger fleets are more inclined to use private networks, while smaller fleets look to public data networks to avoid large infrastructure costs.

inefficiency significantly increases the megabytes needed to update taxi drivers with the critical information they require to compete on the street. For example, a 20-kilobyte message broadcast over a private network to a fleet of 1,500 vehicles uses 20 kb. The same message sent over a public data network uses 30,000 kb (20 kb x 1,500 taxis).

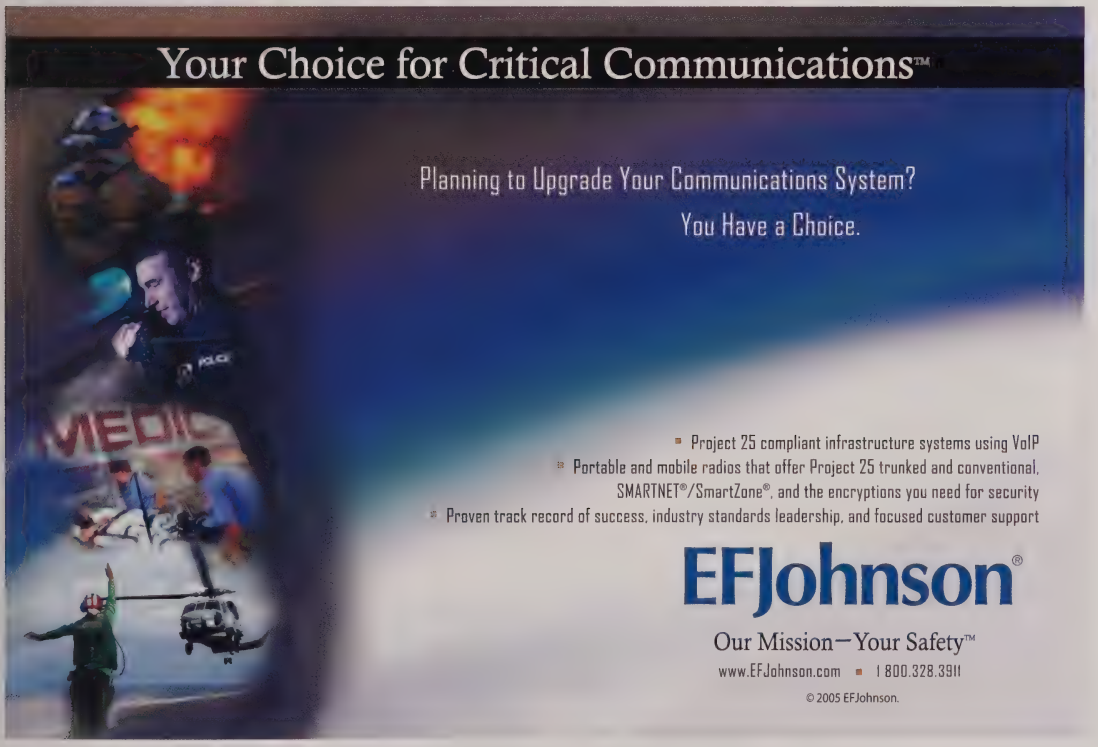
The broadcast capability of private networks enables companies to send data to their drivers more efficiently; but not every broadcast transmission is pertinent to every driver. By sending data only to select taxi drivers, dispatchers using public data networks can significantly reduce the amount of traffic and thus reduce incurred bandwidth costs.

For a company such as LA Taxi Co-Op that relies on advanced computerized dispatching for its high-volume wireless usage, a private mobile radio network is a perfect fit. It is usually stable and predictable and is much more cost effective than a public data network for high-volume data exchange.

Coverage, Control, and Quality of Service

By controlling its RF, a taxi company ensures the timely delivery of a large volume of critical data, which in turn provides the company with a distinct competitive advantage. On the other hand, commercial carriers' capacity plans are based on the average data usage within a region. During peak, high-volume periods, network data lines may not be immediately available. Taxi companies require around-the-clock, high-quality service from commercial carriers that, if available, may increase monthly prices.

Public data networks today service most of the world's population.


Your Choice for Critical Communications™
Planning to Upgrade Your Communications System?
You Have a Choice.
Project 25 compliant infrastructure systems using VoIP
Portable and mobile radios that offer Project 25 trunked and conventional, SMARTNET®/SmartZone®, and the encryptions you need for security
Proven track record of success, industry standards leadership, and focused customer support
EFJohnson®
Our Mission—Your Safety™
www.EFJohnson.com ■ 1 800.328.3911
© 2005 EFJohnson.

See Us at IWCE CIRCLE #56

Commercial carriers have focused extensively on high-population-density areas, which typically align with taxi companies' target markets. Although public data network coverage is improving constantly as carriers install and upgrade base stations, these networks use a higher frequency than private mobile radio networks. Higher frequencies mean a shorter wavelength, resulting in poorer coverage from a single base station. In comparison, private mobile radio networks use fewer base stations to provide comparable coverage to the same geographic area.

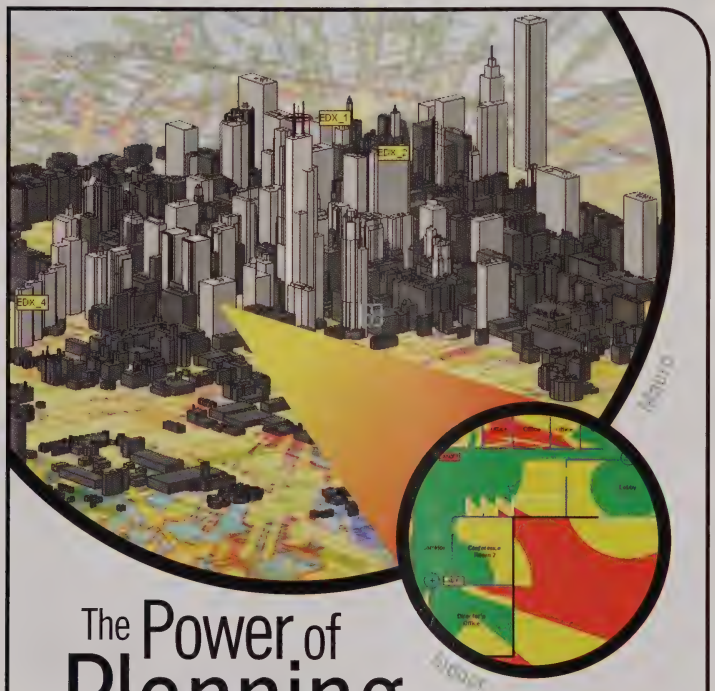
Before choosing a public data network, it is critical to understand a carrier's coverage. In major metropolitan areas with tall buildings or rolling terrain, both private and public data networks often have coverage "shadows," such that a taxi stand can have good coverage on one side of a building and poor coverage on the other, or shadows in areas where there is no line of sight.

A private system can send a message to the entire fleet simultaneously, a feature called "broadcasting."

A Combined Approach

Private mobile radio infrastructure is expensive to support and may not be cost effective in regions outside of a taxi company's main business area, particularly if license restrictions limit pickups to a particular city center. In such cases, it may be wise for fleets serving a large geographic area to switch to a public data network for service in areas of poor private mobile radio coverage.

For instance, if a customer wants to pay by credit card for a taxi ride



The Power of Planning

When you can accurately predict the performance of your wireless network, you can easily achieve your network vision. Experience the confidence of relying on a solid engineering plan, developed with the world's most comprehensive and technically-advanced wireless network planning tool, EDX® SignalPro.®

A powerful planning tool that gives you more analysis features, more propagation models, more flexibility, and more value.

Experience the power of EDX SignalPro.

EDX Wireless, LLC

PO Box 1547
Eugene, OR 97440-1547 USA

Tel: +1-541-345-0019
Fax: +1-541-345-8145
Email: info@edx.com
Web: www.edx.com

EDX WIRELESS

AND KEEP IN MIND ...

the bigger the taxi fleet size, the more cost-effective the private mobile radio network.

from the city to a suburb outside the private network's coverage area, the in-vehicle mobile terminal can switch to a public data network to authenticate and perform the credit card transaction. This is possible provided the dispatch software is designed to handle it.

Some dispatch products are designed to support both private and public data networks and can switch between them on the fly. If you're looking for this functionality, make sure the application recognizes when it is outside private mobile radio coverage and automatically turns on the public data network modem and registers on the public network. Throughout the process, the solution should maintain application state synchronization. When the private mobile radio signal returns, the application should reverse this process, maintaining seamless wireless application coverage throughout the taxi company's business region.

Small taxi companies already are adopting public data networks to capture the efficiencies offered by computerized dispatch systems. In the future, companies the size of LA Taxi Co-Op may benefit from adopting a dual-network usage model, which would enable them to augment existing infrastructure and use a public data network to complement their private mobile radio network. ■

Graeme Harfman is technology product manager for Digital Dispatch Systems' PathFinder taxi dispatch system. He is responsible for optimizing taxi and limousine businesses worldwide. Harfman can be reached at graeme.harfman@digital-dispatch.com.

QuickBooks® Billing Is Here!

NEW VERSION! 4.0

SHOP Software WARE™ Service

Improved Peachtree® Accounting Integration

Software for the Two-way Communications Industry

The word is out! SHOPWARE is the most cost effective service software available. ShopWare is a full package with no need to purchase separate modules. Peachtree® or QuickBooks® can then complete the billing process - saving an extraordinary amount of time. **Order Yours Today!**

ShopWare Modules Now Include

Service Calls	Freq Groups	SMR Systems
Job Tickets	Frequencies	Security
Projects	Signalling	C/R Contracts
Radios	Depot	M/A Contracts
Fixed Sites	Contacts	Twr Contracts
Fixed Equip	FCC Licenses	Time Sheets
Inventory	Parts Order	Rentals

Visit our web site or call for more information and a free demo

800-458-3410
http://www.chargeguard.com

ChargeGuard, Inc.
400 Highland Avenue
Altoona, PA 16602

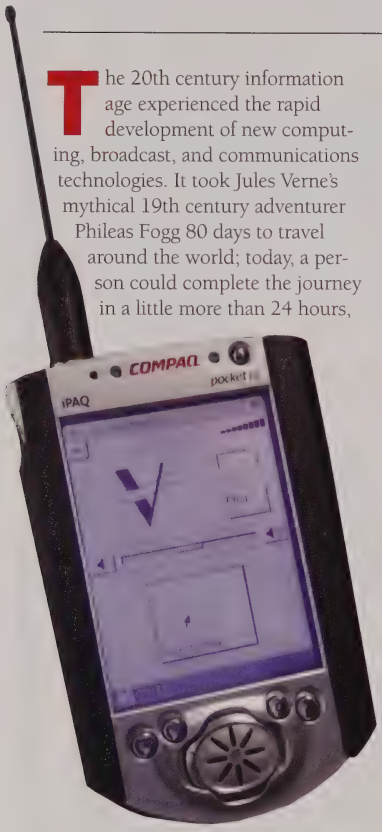
See Us at IWCE CIRCLE #57

Software-Defined Radio: The Future of Communications

As wireless communication moves toward a high-speed data environment, it is adopting a number of trends from the IT world.

By Peter Clemons

The 20th century information age experienced the rapid development of new computing, broadcast, and communications technologies. It took Jules Verne's mythical 19th century adventurer Phileas Fogg 80 days to travel around the world; today, a person could complete the journey in a little more than 24 hours, and information — or a virulent computer virus — covers a similar distance over a broadband connection in milliseconds.



The Vanu Software Radio handheld prototype consists of an off-the-shelf Hewlett-Packard iPAQ running on an Intel Xscale processor and a Linux operating system. Utilizing Vanu software, the device supports commercial analog FM radio service, including family band radio, as well as the public safety Project 25 digital standard. Photo courtesy of Vanu Inc.

As the number of possible connections between people and machines in the Internet age increases exponentially, these same technologies are paradoxically shrinking the size of the world. Outdated, inflexible hardware is evaporating before our eyes and being replaced by more powerful, invisible software. Instead of purchasing heavy machinery and goods, we pay subscriptions to access services and applications. Wired devices are unshackled and allowed to roam freely in a wireless world.

Amid all the hype of wireless technology, one major problem of the early 21st century is the state of mission-critical communications. Many public safety officers, for instance, are roaming the streets with radio systems that do not interoperate with other systems, have limited functionality, provide inadequate security, and become obsolete almost before they are even deployed. It is difficult to comprehend why so many radios used by frontline police today have changed so little from those used 10 or even 20 years ago.

Many police and fire departments are still forced to purchase poor-quality, oversized portable units, expensive and incompatible mobile data terminals, and a conga line of other proprietary, incompatible IT and communications devices. Unless immediate action is taken, it will be several years — perhaps decades — before expensive and obsolete proprietary solutions are replaced with cost-effective, future-proof, integrated standards-based solutions.

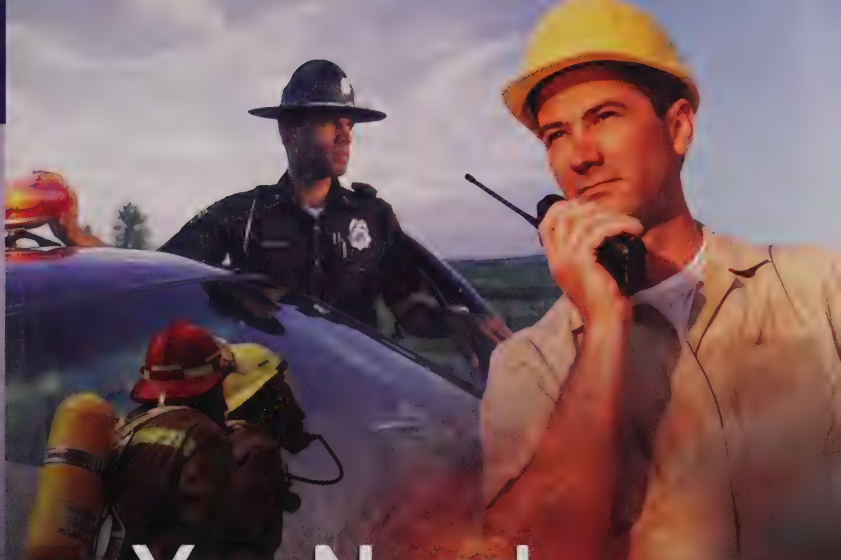
SDR's Current Status

On Sept. 13, 2001, just two days after the events of Sept. 11, the FCC adopted a first report and order (R&O) addressing the use of software-defined radio (SDR). "We anticipate that software-defined radio technology will allow manufacturers to develop reconfigurable transmitters or transceivers that can be multiservice, multistandard, multimode, and multiband," the report states. "Specifically, we are amending our equipment authorization rules to permit equipment manufacturers to make changes in the frequency, power, and modulation parameters of such radios without the need to file a new equipment authorization application with the commission."

According to the SDR Forum, SDR is a "collection of hardware and software technologies that enable reconfigurable system architectures for wireless networks and user terminals." The forum, which has 110 members from approximately 23 countries in all the major International Telecommunication Union

See us at IWCE
Booth #14024

L A N D
M O B I L E
R A D I O
BATTERIES



The Power You Need... Right Now.

When critical communication can't be compromised, you can depend on NABC for all of your Land Mobile Radio power needs.

Quality | With over 30 years experience in advanced battery manufacturing, NABC is committed to provide you with the best products and best performance, 100% of the time.

Selection | A wide selection of LMR batteries are available to meet the most demanding applications. Let us create a customized battery plan to fulfill your needs.

Reliability | Domestic manufacturing and distribution facilities, coupled with outstanding customer service and the best product warranties in the business, means that you can trust NABC to deliver what you want, when you want it.

NABC
North American Battery Company

North American Battery Company | (800) 328-9146 | www.nabccorp.com

CIRCLE #58

(ITU) regions, intends to facilitate the production of multimode, multiband, multifunctional wireless devices that can be adapted, updated, or enhanced through software upgrades. This includes public safety communications. To specifically address the public safety sector, the SDR Forum recently created the Public Safety Special Interest Group (SIG).

SDR in Public Safety

The public safety communications industry faces many challenges. Interoperability has become a top priority following a number of recent high-profile incidents in which responders were unable to communicate with each other. At the same time, as increasingly sophisticated applications are added to information and communications systems, making them richer and more user friendly, most private mobile radio systems around the world still struggle to transmit even basic data.

Public safety organizations have waited for many years to employ more advanced, digital solutions; however, digital technologies can cost several times more than what it takes to maintain existing systems, which puts a strain on capital expenditure budgets at a time when these organizations also need resources to implement other IT-related projects.

Another major problem for public safety communications concerns a lack of features to protect officers from eavesdropping, jamming, denial-of-service, and spoofing attacks by criminal and terrorist organizations. And finally, many current mobile radio systems are still proprietary, meaning that upgrades can be expensive. The availability of applications and connectivity to other systems depend on the goodwill of the supplier, and systems and components can become obsolete at any moment.

Public safety standardization processes in the United States and Europe — Project 25, European Telecommunications Standards Institute (ETSI) Project TETRA, and Project MESA — are moving the industry slowly but steadily toward superior solutions. The steady trend away from proprietary solutions to more open, multisource technologies is welcome, but there is still a long way to go before a majority of public safety organizations have access to affordable equipment.

SDR will resolve many of the problems faced by public safety users. It is a powerful tool that offers significant benefits to all industry participants.

Becoming a Reality

Computer and communications networks and related devices are becoming more powerful, providing a wider range of services and applications. This is good news for SDR, as

Heavy Duty
MCKAY
Rugged dustproof, waterproof design
2.5mm and 3.5mm earphone jacks
Includes receive only earpiece
Modular, replaceable cable
Compatible with Motorola, M/Acom, Ericsson, Kenwood, Icom
How does the Speaker Mic you are using now compare ?
SURVEILLANCE KITS ALSO AVAILABLE
NEW TACTICAL GROUP HEADSETS
(Contact us for more details and to arrange a demonstration)
McKay™
radio accessories
PROFESSIONAL TWO WAY RADIO EARPIECES AND HEADSETS
(860) 808 1276 sales@mckayheadsets.com
See us at IWCE, Las Vegas, NV, April 6-8, 2005 Booth 12064
www.mckayheadsets.com
CIRCLE #59

plenty of good ideas, prototypes, and products are now reaching the deployment stage and are likely to have an impact on the market within months rather than years. Here are some of the highlights:

- In June 2003, U.S.-based Vanu installed an all-software GSM base station using off-the-shelf servers — Intel processors running the Linux operating system — for Mid-Tex Cellular in Texas. (See diagram on page 80.)
- In August 2003, Harris Corp. and Communications Research Centre Canada (CRC) demonstrated interoperability between different operating systems based on the Software Communications Architecture (SCA) as part of the U.S. Department of Defense's multibillion dollar Joint Tactical Radio System (JTRS) program.
- Regulators in the United States, Canada, United Kingdom, Germany, Japan, Australia, and other countries are taking an active interest in the development of SDR solutions to improve spectrum efficiency and provide more flexible spectrum management ahead of future implementations of spectrum-trading mechanisms.
- Numerous startups and more traditional ventures are investing in new technologies such as application-specific integrated circuits (ASICs), reconfigurable logic, antennas, chipsets, network design, open software architectures, and applications that will fuel the next generation of SDR solutions.

As the wireless communications industry moves toward a high-speed data environment, it is adopting a number of trends from the IT world. In the near future, 3G handset users will need to communicate with each other seamlessly over compatible platforms on a global scale. Modular, open system architectures based on open software solutions are the best way to achieve this end.

Operators and end users no longer want to be tied to a limited number of solutions and do not want to pick up the bill for excessively high licensing costs for intellectual property. The Open Base Station Architecture Initiative (OBSAI) is an example of a new association promoting open interfaces and greater industry cooperation.

It is also increasingly important in an SDR environment for governments, operators, large user groups, and applications developers to have reasonable access to the source code of operating systems so that potential flaws and bugs can be checked and corrected quickly.

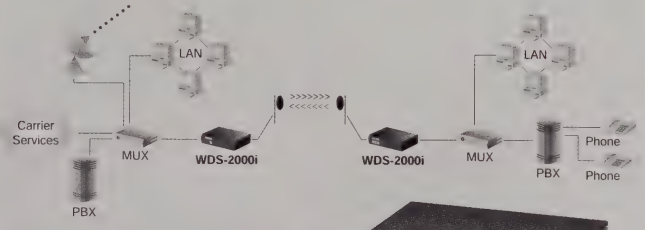
Software industry icons Tim Berners-Lee of the World Wide Web Consortium and Richard Stallman of the Free Software Foundation believe that by allowing their intellectual property to be used freely for the common good, the whole global community will benefit from better

Replace your legacy analog VHF/UHF system and expand your voice and data capacity with a low cost digiNX Wireless Delivery System—a spectrally efficient, Point-to-Point digital radio that supports:

- Multiple voice & Data channels
- Ethernet
- Programmable frequency spectrum
- Programmable Interfaces, all STDs

Ideal for telephone line extension, leased line replacement, Monitoring and Control, WAN/LAN, remote oil field operations and many more.

Please call for more information and IMMEDIATE delivery, or visit our Web site.



TELEPOINT INC.
1022 S. La Cienega Blvd.
Los Angeles, CA 90035
Phone: 310-652-3666
Fax: 310-652-0777
Toll Free: 800-333-6444
E-mail: info@telepointinc.com

www.telepointinc.com

CIRCLE #60

solutions at accessible prices.

It is not surprising that many early SDR solutions currently coming to market are running on the Linux operating system rather than the Windows platform. Is it also possible that a more effective, flexible, and universal communications policy could be built around emerging solutions enabled by SDR technology?

Positive Signs of Innovation

Digital standards such as Project 25 and TETRA have led to significant progress in addressing communications needs in the United States, Europe, and other markets. Fortunately, innovation is alive and well in the industry, often from unexpected sources. Infrastructure and handset suppliers are striving to provide seamless interoperability across multiple communications platforms and air interfaces based on open hardware and software standards, IP/VoIP and related network standards, and commercial off-the-shelf (COTS) components. These innovators will be in a strong position to exploit the latest advances in SDR technology. Here are a few examples.

- M/A-COM recently introduced its VIDA (voice, interoperability, data, and access) network concept based on VoIP and the Unified Network Architecture (UNA), which supports access for its own OpenSky, EDACS, and P25-IP solutions as well as future technologies and other trunked systems.
- New Zealand-based Tait produced a next-generation, software-intensive MPT 1327 solution that could incorporate new protocols such as Project 25 in the near future.
- Rohill in the Netherlands designed a TetraNode IP solution with softswitch technology, open hardware and software components, IP and optimized IP interfaces, and multiprotocol support. TETRA and MPT 1327 air interfaces have already been implemented; standard technologies such as Project 25, GSM-R, and even GPRS/UMTS could be incorporated in the future.

Handsets have also incorporated increased computing power, which should eventually allow them to switch seamlessly between different frequencies and modulation schemes. For instance, Thales' MBITR radio offers users a handheld radio operating in the 30-512 MHz range with multiple modulation techniques.

Imagine if we could switch seamlessly from one air interface protocol to another on the same terminal through a common infrastructure, optimizing operational performance and available spectrum allocations. We are now closer than ever to having enough computing power in systems and terminals to create a new paradigm in digital mobile radio.

Even global industry heavyweights

CIRCLE #61

For regulators, SDR techniques will improve spectrum efficiency at a time when this resource has become increasingly scarce, and, therefore, valuable.

such as Motorola and EADS Telecom, which tend to rely on strong, proprietary solutions, are now talking up standards-driven IP technologies with connectivity to other vendors' systems and access to third-party applications. Motorola is shipping an IP version of its Dimetra solution for TETRA users, and EADS Telecom has announced an IP version of its Tetrapol technology.

Who Benefits from SDR?

SDR offers national governments increased economic efficiency, and can boost employment levels in new, highly productive, and innovative technology fields, allowing countries that adopt SDR at an early stage to better compete with trade rivals. By some accounts, SDR may also lead to increased income through taxes, allowing more services to be provided for the electorate.

For regulators, SDR techniques will improve spectrum efficiency at a time when this resource has become increasingly scarce, and, therefore, valuable. It is no longer acceptable even for public safety users to be allocated generous amounts of spectrum that will be underutilized due to a lack of adequate provisions. Regulators will also have less hardware components to certify, and interference will be reduced due to the increased sophistication of equipment.

Special interest groups such as the SDR Forum pool the specialized resources of more than 100 major industry participants to develop compatible products. They provide their members with information, an increased profile, and access to governments, regulators, and other groups that could benefit from the technology.

Manufacturers will see the benefits of lower development costs, lower costs of replacing faulty equipment, and significant economies of scale by globally providing standard, flexible, open solutions. This process also allows increased specialization, which generates intellectual property,

Q-MAC Electronics

Remote Area - HF Transceivers
Emergency Aid & Relief Communications

HF-90 MINI PACK

The Q-MAC HF-90 MiniPack is the world's smallest high-power (50W) portable HF SSB radio communication system. The entire package, comprising transceiver, microphone, broadband antenna system, mains charger and battery system, is contained within a rugged Pelican® Case. When closed, the package is fully waterproof (submersible) and is easily carried by hand or in the back of any vehicle.

The HF-90 MiniPack delivers reliable long-range performance, yet takes only minutes to deploy in the field. Leading edge circuit design yields exception battery performance without compromising power output. The transceiver sits up out of the case on a compact aluminium rack (which is also used to store the antenna and power cable whilst in transit).

When used together with an AC mains charger, the HF-90 MiniPack is ideal for temporary base station applications. This package, being exceptionally compact and lightweight (3.9kg), is designed for applications where minimal size/weight is of paramount importance - such as international aid/relief operations. Accessories and options available include Solar Panel chargers and Frequency Hopping for secure communication.

HF-90 DISASTER RESPONSE PACK

The Q-MAC HF-90 Disaster Response Package is a transportable 'all-in-one' HF communications package. Along with the HF-90 Transceiver, the package contains a variety of antennas, AC/DC power/charger systems, carry packs/cases and mounting accessories. Using the appropriate combination of HF-90 Transceiver and accessories, the operator will have the ability to set up any of the following systems:

- Manpack system (walk and talk)
- Portable systems (stop and deploy)
- Fixed vehicle system (mobile)
- Fixed base station system - using AC mains power

The package offers full flexibility to the operator in the field, who may not know what type of communications system is required until a disaster area has been surveyed. Additional HF-90 Transceivers may be added to the package as required, so that a variety of systems can be achieved simultaneously.

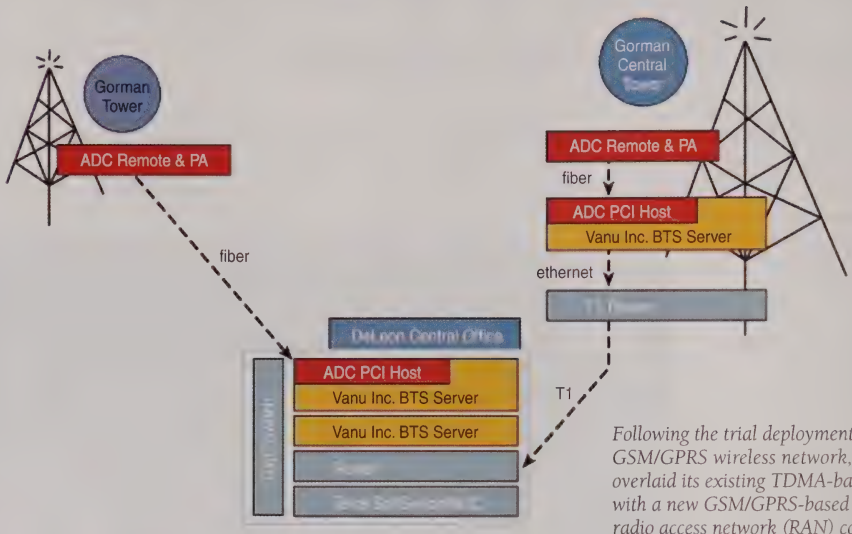
This package is designed specifically for humanitarian and emergency services organisations that must be able to deploy staff and equipment into a disaster area within a very short time frame. The entire package at 47Kg is conveniently housed in a sturdy aluminium road case with wheels, so that it may be transported by a single person. This allows the package to be transported to site, deployed, returned to headquarters and then restocked for future use. The HF-90 Disaster Response Pack is currently in use by several UN aid agencies.

info@qmac.com www.qmac.com

The HF-90 is manufactured in Australia and exported to over 85 countries world-wide.

CIRCLE #62

Architecture of a Trial Network at Mid-Tex Cellular



Following the trial deployment of a software-based GSM/GPRS wireless network, Mid-Tex Cellular overlaid its existing TDMA-based wireless network with a new GSM/GPRS-based system by installing a radio access network (RAN) composed of HP servers and Vanu software. Diagram courtesy of Vanu Inc.

SIMULCAST OVER NET

with Dalman's

SOLAR
Network Interface

Designers and manufacturers of a range of Simulcast Infrastructure Components currently used in Public Safety and Utility communication systems Worldwide.

www.dalmants.co.uk

Dalman

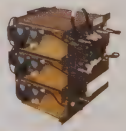
Dalman Technical Services Ltd
23 Focus Way, Walworth, Andover,
Hampshire, SP10 5NY, UK
Tel: [+44] (0)1264 357580
email: info@dalmants.co.uk

See Us at IWCE CIRCLE #63

dbSpectra **Homeland**
Security Solutions

Cavity Filters

Transmit Combiners



Receiver Multicouplers

Tower Top Amplifiers

Duplexers

Control Station Combiners

dbSpectra manufactures and sells products in the 30-960 MHz LMR Market. We can provide system solutions for all of your site management needs. dbSpectra has been licensed to provide the legacy Decibel Products filter equipment.

Phone: 972.389.0595
Email: sales@dbspectra.com

www.dbSpectra.com

See Us at IWCE CIRCLE #64

knowledge economies, added value to existing product lines, and greater industry cooperation for solutions that users actually want.

Service providers and system integrators will have access to a wider choice of compatible solutions with greater flexibility to tailor their efforts to specific user requirements. They will be taking fewer risks by investing in "consensus" technologies that will not quickly become obsolete. They will also have the opportunity to add their own value with third-party software solutions.

Software companies and application providers will see a new market open for their solutions, with enormous potential economies of scale for software applications developed for converged communications platforms. Software companies will be able to integrate and modify existing solutions to suit the new SDR solutions. There will be significant incentives for innovation and growth due to the portability of intellectual property.

End users will benefit from a greater choice of services and applications, giving them a much richer mobile communications experience. It will be easier to communicate, using the most convenient device and medium at any particular time. Although there is likely to be a price premium placed on such services early in deployment, the costs in the medium- to long-term will come down very quickly.

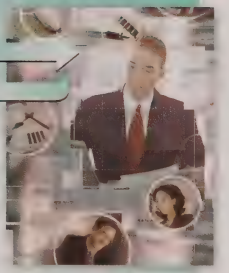
A Brave New World

In an SDR world, users are empowered to purchase the most appropriate mix of products, services, and applications to meet their needs. Over the coming years, SDR solutions will become commonplace, and economies of scale will be achieved across a wide range of industry segments. Developers will tap into research and development from countless specialized technologies, offering increased security and functionality for SDR at a reasonable price.

Strong regulation must be in place to guarantee open, modular system architectures and a fair intellectual property rights (IPR) regime, which rewards the exploitation of cutting-edge technologies for the benefit of everyone and reprimands companies that attempt to suppress innovation and competition. As a key enabler of a safer world for you, me, public safety officers, and critical infrastructure employees, SDR must not be stifled. ■

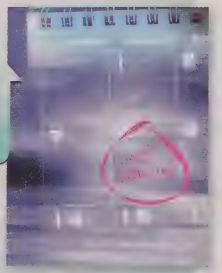
Peter Clemons worked on development projects in Latin America prior to joining a mobile communications consulting firm in his native England. In 1998, he established his own consulting business. Contact him at clemonsp@aol.com.

Experts in Engineering
High Performance Networks for Public Safety



expand
with RF Engineering that builds for the future
- RF network optimization
- Usage projections and growth planning

connect
with Network Engineering solutions
- Network optimization
- Identify cost reductions
- Maximize capacity and improve interoperability



excel
with Strategic Planning services
- Technology evaluations
- Complete project management for network buildout, enhancement and expansion

VCOMM TELECOMMUNICATIONS ENGINEERING®

Engineering Networks for High Performance

3 Cedar Brook Drive • Cranbury, NJ 08512 ■ (609) 655-1200 • Fax: (609) 409-1927
1710 Walton Road • Suite 100 • Blue Bell, PA 19422 ■ (610) 684-1000 • Fax: (610) 567-0150

www.vcomm-eng.com

CIRCLE #65

POSITRON

Command & Control

Positron Public Safety Systems

Positron Public Safety Systems' end-to-end suite of applications span the entire workflow of an emergency response organization, from call handling, mapping, CAD, mobile, radio, automatic vehicle location, records management, automatic field reporting and management information systems. Positron systems do more, share more and work together more, right out of the box. They offer the benefits of the richest command and control experience available, without costly and ongoing post-deployment integration. Positron's approach is the only path to an affordable, feature rich and evolving system – with a single number to call when you need support or expansion.

Fully Integrated Solutions

800-443-3313 • www.positron911.com

CIRCLE #66

PUBLIC SAFETY REPORT

COMMUNICATIONS SOLUTIONS FOR PUBLIC SAFETY

CONTENTS

SPECTRUM OPPORTUNITIES 83 E9-1-1 TECHNOLOGY OF TOMORROW 90
CHECK YOUR NOISE FLOOR 96 PROJECT MESA 102 ARIZONA'S INTEROP QUEST 102

Spectrum Opportunities in the United States and Around the World

By Bette Rinehart

Activity is soaring in the spectrum arena that promotes public safety and public protection and disaster relief (PPDR) communications. Governments around the world recognize that adequate PPDR services are necessary to ensure the safety of human lives and protect property, and that the ability of first responders and other PPDR agencies to communicate effectively and efficiently is critical.

The United States was first to recognize the importance of sufficient spectrum for its first responders when it allocated spectrum for voice, data, and video public safety services in the 746-806 MHz and 4940-4990 MHz (4.9 GHz) bands. Canada and Mexico have followed suit and currently are engaged in the regulatory process of allocating spectrum in these frequency bands, while many other countries also are evaluating the need for national PPDR spectrum.

Trends in Spectrum Management

Three trends in PPDR and commercial communications technology have influenced spectrum management globally. They are: 1) increased adoption of digital modulation technologies; 2) broad bandwidths to support voice, high-speed data, and real-time video; and 3) the evolution of standards to facilitate interoperability.

Digital communications provide certain benefits over analog technology. For instance, digital radio systems, with new features for voice and data, can accommodate more users, which leads to increased spectrum efficiency. They also offer a level of inherent privacy and security. Digital voice and data coding maintains the quality of the voice or data in the encrypted or protected modes. And, finally, the integration of voice and data is perhaps the greatest benefit of digital radio systems. Voice transmissions are actually data packets, enabling much-improved and tighter integration between voice and external data devices.

In an increasingly mobile society, public safety entities recognize the benefits of data while in their vehicles, on the street, or at the scene of an incident. Using broadband wireless technologies, firefighters can download a burning building's blueprints prior to entering it. Police can transmit mug shots or alert officers of missing children. Emergency medical personnel en

This is not some business deal that's only important to our lawyers and financial people. IPC and Orbacom form a combined company that now provide you with the most advanced Command and Control communications solutions ever available. Strategic real-time VoIP solutions, with capabilities you may never have thought possible – like conferencing thousands of users in seconds with the touch of a button, in any mix of landline, radio and gateway protocols. Near-instantaneous connection times. Text messaging between users to convey additional information while voice conferencing continues. Touch screen command center access and programmable macro keys for all functions. In short, we can deliver the communications solution you

IPC Acquires Orbacom Systems and Forms Command and Control Division

–Will Combine Technology to Enhance Offerings in Public Safety, Homeland Security and Other Key Markets–

NEW YORK, New York, December 1, 2004 – IPC Information Systems, LLC, announced today that it has acquired innovative Command and Control company Orbacom Systems, Inc.

Orbacom provides specialized radio consoles and computer-aided dispatch software for Command and Control communications. The company serves the mission-critical communications needs of government agencies and corporations.

IPC will consolidate its existing Command and Control operations with those of Orbacom to serve more than 1,400 customers at over 2,000 locations worldwide.

A proud day for us. Not a bad day for you, either.

need now, to effectively deal with the situations you face now. All with 99.999% connectivity uptime, global service and support, and customized applications that meet your real needs precisely.

Contact us. We're ready to help. Now.

www.ipc.com

IPC®

route to a hospital can transmit video of an accident victim's injuries to doctors, who might be able to offer life-saving advice while awaiting the patient's arrival. Supporting these increased requirements, however, requires significant increases in spectrum availability.

In the United States, interoperability is a priority for federal, state, and local public safety agencies. Interoperability has also received increased attention since the terrorist attacks of Sept. 11, 2001. Public safety agencies must be able to communicate with one another during disasters and on a day-to-day basis. To facilitate interoperability, regulators have begun to mandate that radio equipment be built to certain interoperability standards.

Recent U.S. spectrum allocations for public safety in the 700 MHz and

ITU Sets a Global Course

The ITU is developing spectrum policy through the cooperation of its member countries. ITU's Radiocommunication Sector develops operational procedures for various wireless services based on the technical characteristics of the spectrum.

ITU member states around the world took notice of the growing telecommunication spectrum needs of the PPDR community and devoted an agenda item to PPDR at WRC-03. The outcome was the PPDR Resolution, which strongly recommended the allocation of harmonized spectrum for PPDR and encouraged member states to allocate spectrum in the bands identified for their region.

More than 150 ITU member states supported the identification of globally/regionally harmonized bands for narrowband, wideband, and broadband technologies. They believed that spectrum harmonization would bring significant long-term benefits to administrations and their PPDR user communities, including a favorable basis upon which interoperability and operational efficiency could evolve both nationally and internationally. Furthermore, identification of harmonized spectrum suitable for PPDR applications would provide flexibility for each administration to make decisions on access to spectrum in line with national requirements.

The WRC-03 PPDR Resolution encouraged the use of the following frequency bands/ranges, or parts thereof, when undertaking national planning:

- Region 1 (Europe, Middle East, Africa): 380-470 MHz band.
- Region 2 (the Americas): 746-806 MHz, 806-869 MHz, and 4940-4990 MHz bands.
- Region 3 (Asia/Pacific): 406.1-430.0 MHz, 440-470 MHz, 806-824/851-869 MHz, 4940-4990 MHz, and 5850-5925 MHz bands. (Some countries in Region 3 also have identified the bands 380-400 MHz and 746-806 MHz for PPDR applications.)

As indicated by all this activity, the world is paying increased attention to spectrum allocations for emergency response to life- and property-threatening events. Public safety is poised to take advantage of advancements in technology as soon as the spectrum is actually made available and accessible in their respective countries.

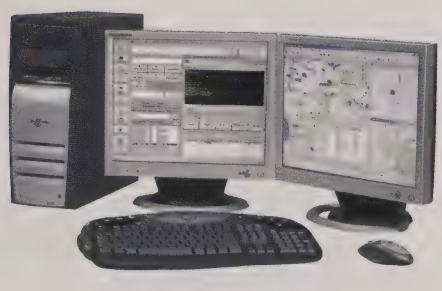
SAVOX
Secure
your two-way connection
The New SAVOX® C-C500 MPM (Multi Purpose Microphone Speaker) is also a Push-To-Talk unit that adapts any headset to your two-way radio, securing clear and efficient radio communications in all situations. The perfect com-solution for any public safety application.
ProComm Americas Ltd.
P.O.Box 392 (925 Golden Beech Drive) Brookville; OH 45309
Phone 1-937-833-9124 • Fax 1-937-833-0916
info@procommamericas.com
ATEX
approved
See Us at IWCE, Booth 2050
CIRCLE #68

Who will bring you tomorrow's technology?

The people who brought you today's.

These are exciting times for call-center technology. With the convergence of telephony, computer-aided dispatch, mapping, digital logging recording, radio, and more on the desktop, emergency call-takers can do more in less time.

Since 1968, Plant Equipment, Inc. has been integrating technologies to build a better call-center platform. Our technology helps save lives everyday, but we know that tomorrow's challenges will only be greater. That's why we are dedicated to investing in the future. Our people, our products, and our vision are focused on bringing you tomorrow's technology.



ADVANCED CALL PROCESSING

MAPPING · GIS · CAD · RMS

MANAGEMENT INFORMATION SYSTEMS

INTEGRATED DIGITAL LOGGING

REMOTE MONITORING & MAINTENANCE

INTEGRATION & IMPLEMENTATION SERVICES

PLANT EQUIPMENT, INC.

951.719.2100 www.peinc.com

CIRCLE #69

4.9 GHz bands have addressed all three of these trends.

The 700 MHz Band

The FCC allocated 24 megahertz of spectrum in the 700 MHz band to public safety in 1996 after a group of public safety leaders, formally known as the Public Safety Wireless Advisory Committee (PSWAC), spent a year studying the present and future communications needs of public safety. PSWAC determined that the public safety community required nearly 100 megahertz of additional spectrum by the year 2010. It recommended that approximately 25 megahertz of this spectrum be made available in the 700 MHz band within five years of the report, or by 2001.

Congress and the FCC responded in 1997, allocating 24 megahertz of spectrum in the 700 MHz band for public safety. Efforts are still under way to clear TV stations from that spectrum so it can be deployed. In allocating the 700 MHz band, the FCC mandated digital modulation and channelized the band in both narrowband and wideband segments. The narrowband channels are primarily for voice and the wideband channels mostly for data.

Approximately 10 percent of the spectrum was allocated specifically for interoperability. All portable and mobile radios developed for the 700 MHz public safety band must be able to operate on the interoperability channels and must conform to the Project 25 Phase 1 public safety digital interoperability standard.

In the United States, standards have been user-driven. In the early 1990s, a coalition of federal, state, and local public safety agencies established a committee to develop interoperable digital standards in cooperation with the Telecommunications Industry Association (TIA). This Project 25 committee first determined user needs and then examined the relevant digital platforms that met those needs. The FCC adopted the Project 25 standard, which is supported by multiple manufacturers, for the 700 MHz narrowband allocation.

Photo courtesy of Motorola

Public safety agencies will take advantage of advancements in technology as soon as spectrum is actually made available and accessible in their respective countries.

Industry Canada recently released a notice announcing its decision to allocate spectrum in the 746-806 MHz band to mobile radio services on a co-primary basis with television broadcast. A portion of the 700 MHz band also has been designated for public safety operations. The notice seeks comment on the technical and licensing rules that should be enacted for public safety entities to implement the services.

The 4.9 GHz Band

In February 2002, the United States also allocated 50 megahertz of spectrum between 4940-4990 MHz for public safety use in support of primarily localized broadband communications requirements. This band had originally been targeted for auction to support commercial services; however, based on input received during the consultation period, the FCC determined that the public interest would be best served by allocating this spectrum for public safety use.

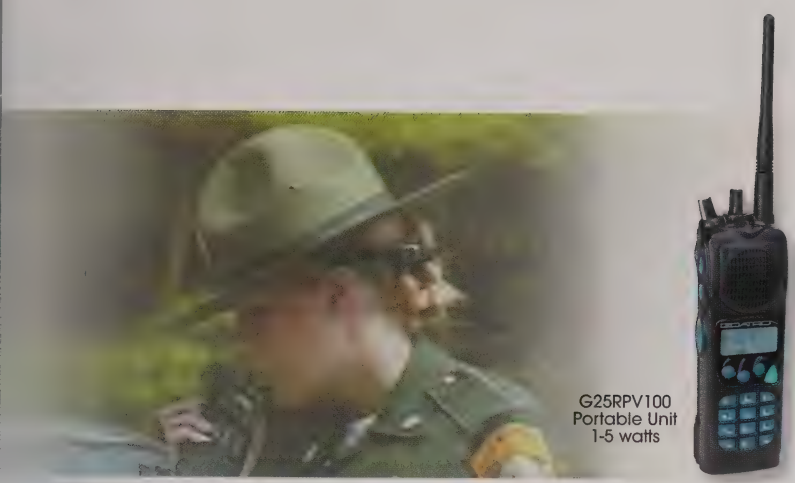
The FCC issued a follow-up decision in April 2003, adopting service rules for the band. While several of the detailed rules may yet be revised, public safety is wasting no time in preparing for use of this band. As of September 2004, there were almost 200 4.9 GHz licenses granted to public safety agencies throughout the United States. In late September, Industry Canada also issued a notice designating spectrum at 4.9 GHz for fixed and mobile service in support of public safety. ■

Bette Rinehart is a 20-year veteran with Motorola who has spent the majority of her career working on spectrum issues. Contact Bette at C18923@motorola.com.

See us at IWCE Booth #6060

All bases covered!

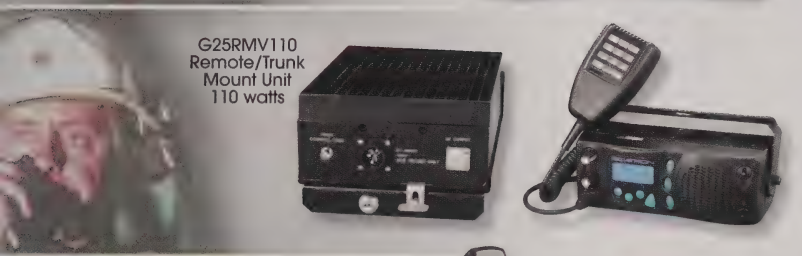
A complete line of Project 25 VHF radios for every situation



G25RPV100
Portable Unit
1-5 watts

G25RMV110-5
5 watts Low Profile
Mobile Radio

G25RMV100
Mobile Unit
50 watts



G25RMV110
Remote/Trunk
Mount Unit
110 watts

G25RBV100
50W Desktop Radio

G25RBV110
110 watt High Power
Base Station Radio

High performance digital radios for government, public safety and business.

- A complete line of Project 25 compatible VHF products
- Portable, mobile and desktop models
- A wide range of options and accessories
- P25 Digital, backward compatible to analog wide and narrow band operations
- 136-174 MHz
- 256 Channels, 16 zones, 4 channel banks, shadow channels
- Software defined keys - user programmable
- Backlit display
- DES-SBCF Encryption
- PC-based Windows programming software
- Cloning
- Fire features package now available

GUARDIAN™ BY DATRON

DATRON
Datron World Communications, Inc.

CIRCLE #70

Contact us today: 760.597.1500
3030 Enterprise Ct. Vista, CA 92081
www.dtwc.com • sales@dtwc.com

The Technology of Tomorrow

State and regional authorities, take heed. To choose the best E9-1-1 solution for your PSAPs, it is important to understand what the future holds for emergency communications technology.

By Guy Roe

Before there was any communications technology, if you needed emergency aid you went on foot or by horse to the appropriate responder — sheriff, police, or fire brigade — and asked for help. Then came limited printed communication, followed by the telegraph, and later, the telephone. For the first time, individuals had communication capabilities right in their own home.

Early telephone systems featured a plug-based switch panel that required an operator to manually place the call. If it were a call for help, the operator could pass the information directly to the appropriate responding agency.

The telephone also came to be used to dispatch assistance, with the station calling the cop on the beat using street-corner police call boxes. Soon, new radio technology enabled calls to be dispatched almost instantly. This "state-of-the-art" system remained in use through the 1970s.

As telephones and long distance became ubiquitous in the 1950s, the telephone company developed centralized automated message accounting (CAMA) to automatically identify the calling number and time the call, allowing for necessary billing. When the first 9-1-1 systems were developed in the 1970s, they used CAMA to provide automatic number identification (ANI).

Later, the ANI-provided number was used to initiate an E9-1-1 query to an automatic location information (ALI) database using a separate circuit, providing a 9-1-1 center with the caller's location. This method continues to work fairly well for wireline calls.

New Mobility, New Problems

Problems arose, however, with the emergence of mobile phones. Because callers were no longer tied to a specific location — early cellular phones were often mounted in automobiles — emergency calls were typically routed to the state police or highway patrol. The calls could, and did, come from everywhere. Emergency personnel needed to know where the call was coming from, but traditional CAMA trunk lines were unable to handle the amount of data needed to locate a mobile caller using callpath associated signaling (CAS), where the call and associated data travel the same telephone-based path.

Non-CAS (NCAS) was developed to solve these problems, sending the voice element of the call over telephone trunks while the call signaling information travels a different data transmission path. NCAS worked, but it was a less-than-ideal solution based on the modification of a system never designed for 9-1-1 in the first place.

In recent years, a plethora of new modes of communication have emerged, many made possible by the Internet, which communicates using a system of data packets delivered via IP. The most prevalent of these new communications modes is VoIP or Internet telephony. IP offers a viable solution for emergency

Every day, public safety personnel make split-second decisions based on information they receive from a command center. If the system they depend on to deliver that information doesn't perform, their safety is at stake. Don't risk the safety of your field personnel on a network shared with cell phone users. Public networks don't provide the service guarantees required by first responders. Dataradio's Trusted Wireless Data Networks do.

Our Trusted Wireless Data products for mobile data licensed networks provide cost effective, easily deployable, guaranteed solutions with a support team available for today's network planning and tomorrow's network expansion. Put Trusted Wireless Data Solutions to work for you. Call **800-992-7774** or visit **www.dataradio.com/mc**.

WHO'S AT RISK IF YOUR MOBILE DATA SYSTEM DOESN'T DELIVER?

TRUSTED WIRELESS DATA

DATARADIO®

© 2004 Dataradio. All rights reserved.

communications and promises to overcome many of the inadequacies of today's CAMA-based networks.

A major benefit of using IP-based delivery is that public safety 9-1-1 communication delivery no longer is limited to 10- or 20-digit streams. A single digital line can handle all the needs of a four- to eight-seat PSAP, including voice communication via VoIP.

Unlike specialized telephone circuits, IP technology is multidirectional and not restricted to passing data only between the local exchange carrier (LEC), central office, and the PSAP. An IP network is capable of receiving information from state or regional centers and then sharing information back to the centers, between PSAPs, or with emergency management centers and other public safety stakeholders.

A New Paradigm

Today's problems with existing wireline E9-1-1 infrastructure have been widely reported. Studies indicate that the current telephone technology-based 9-1-1 system is dangerously outmoded and incapable of handling 9-1-1 in the future. To solve these problems, a new infrastructure paradigm is needed.

In 2002, the FCC released the Hatfield Report, which outlined technical and operational issues impacting wireless 9-1-1. One of the principal findings of the report was that "the existing wireline E9-1-1 infrastructure, while generally reliable, is seriously antiquated. Indeed, it turns out that the existing wireline E9-1-1 infrastructure is built upon not only an outdated technology, but also one that was originally designed for an entirely different purpose. It is an analog technology in an overwhelmingly digital world."

Long before the release of the Hatfield Report, NENA began developing a 9-1-1 future path plan to "make sure two things happen — that we deal effectively with the new challenges in bringing 9-1-1 services to all callers and that we retain appropriate previous capabilities and reliability."

The plan recognizes the growing number of 9-1-1-capable devices such as telematics and text-messaging devices, and states that when adding components and functions to the overall 9-1-1 system, developers must consider whether the proposed method is clearly more effective, more dependable, and/or more economical than other alternatives. "A technical plan for future 9-1-1 systems needs to provide a long-term direction for development to support new call sources and needs," the plan states.

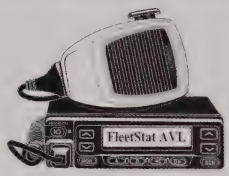
All NENA future models anticipate additional call and/or data originators and recipients, and envision the use of IP networks, likely in the form of private networks, possibly with portals to virtual private networks (VPNs). In addition, all models recognize that any new, integrated solution has to be implemented according to a "top-down" plan.

IP Systems of the Future

New IP-based E9-1-1 technologies have been developed to facilitate a dedicated, secure public safety IP network infrastructure that provides adequate bandwidth for all public safety needs while remaining both

FleetStatAVL

Complete AVL Tracking Software Package:
$299.00



- GPS kits built right into mobile radio.
- Complete mapping and messaging software
- Vehicle trace and playback features
- Increased system revenues for dealers

www.fleetstat.com * (800) 233-8818

COOK'S COMMUNICATIONS

See Us at IWCE CIRCLE #72

THE CHOICE IS CLEAR

Real-time 3-D mapping, integrated FCC searches, FCC filings and unlimited technical support are just a few of the reasons why thousands of customers around the world trust RadioSoft for their frequency mapping, management and maintenance solutions.

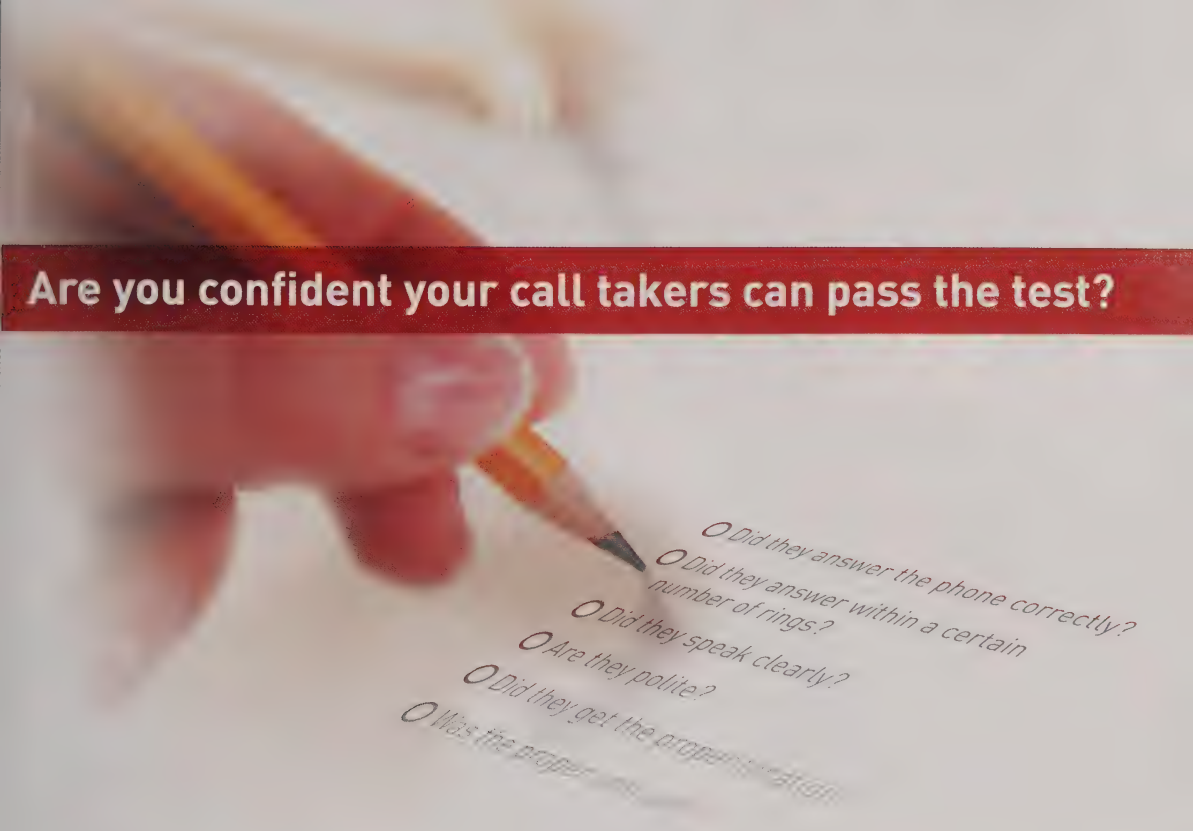
To find out more about RadioSoft products and services, contact us today at 1-888-RADIO95 or visit us at IWCE, booth #13041.

RADIO SOFT

THE CLEAR CHOICE FOR SPECTRUM MANAGEMENT.

CIRCLE #73

Are you confident your call takers can pass the test?


Did they answer the phone correctly?
Did they answer within a certain number of rings?
Did they speak clearly?
Are they polite?
Did they get the

There's only one way to be sure:
Record AND Evaluate Call Takers with Mercom

Mercom has proudly served the public safety market with advanced call recording systems since 1996. Thousands of satisfied customers worldwide rely on Mercom Audiolog™ systems for accurate and reliable call recording solutions.

Now Mercom Audiolog™ systems work with Mercom Interaction Quality™ (MIQ) software to help you comply with new mandates for evaluating the performance of call takers. Use Mercom Interaction Quality™ browser-based software to create customized scoring forms, to evaluate calls, and to obtain detailed and summary reports.

Mercom Audiolog™ is the advanced integrated system for recording telephones, lines, consoles, trunked and conventional radio, and PC screens. All Mercom recording platforms now utilize Microsoft® Windows® 2000, Microsoft® SQL® Server 2000 catalog database, and Intel® Pentium IV® processors.

NEW FROM MERCOM!

Audiolog™ MAX-PRO™ Fault-tolerant systems with up to 96 analog or 120 digital channels, new compression options.

Audiolog™ ULTRA-PRO™ Fault-tolerant systems with up to 192 analog or 240 digital channels, new compression options.

Mercom ECHO® Cost effective recording system for smaller public safety sites; 4 to 48 channels.

Check it out yourself and see why thousands of public safety organizations are using Mercom to be sure that calls are recorded, and that takers are getting the information they need by asking the right questions.

Be sure. For more information, call 1-201-507-8800
Or visit www.mercom.com

MERCOM

CIRCLE #74

secure and survivable. State or regional centers provide a secure entry point — a "doorway" — to the 9-1-1 system for all current and future types of emergency communication. Centers are able to quickly and accurately deliver all types of 9-1-1 calls with their associated data to the correct PSAP using the public safety IP network infrastructure.

The solution allows centers to receive wireline, wireless, VoIP, and future call types. Call routing is based on Master Street Address Guide (MSAG) valid civil address, geographic coordinates, cell and sector or real-time geocode. A single type of NENA standard feed facilitates delivery to the PSAPs, making it much easier for centers to respond to new requirements while reducing operating costs. Because all 9-1-1 calls for service are routed through a central system, officials can keep statistics on call volumes for equitable distribution of 9-1-1 surcharges, helping to eliminate inequities in surcharge distribution. Call statistics also can be used for deployment analysis.

IP infrastructure is capable of transporting many types of data. The same network that supports 9-1-1 call delivery also can be used for a myriad of other public safety functions. For example, in New York state, IP infrastructure can support state eJustice initiatives such as the NYS Police Information Network (NYSPIN), NCIC 2000, and the Cardscan/Livescan fingerprint system. It also could be used in the statewide wireless radio system and for NYeNET access to non-law enforcement data.

Next-generation systems also are prepared to handle emergency notification via voice and Web, national network integration, and services such as OnStar and telematics. Integrated capabilities facilitate interjurisdictional voice and data transfers, and because it's IP-based, the technology can replace multiple types of communication system feeds with a single standardized type of IP feed.

An additional feature of this E9-1-1 technology is the integrated emergency management and control component. Combining the critical area response manager (CARM) for strategic emergency planning with the spatial event server (SES) allows PSAP-level data previously unavailable outside of the individual PSAPs to be shared between jurisdictions as well as on a state or national homeland security level. These features and capabilities exceed anything previously proposed for strategic emergency management.

There would, of course, have to be at least two connections to each PSAP for redundancy and survivability. The nature of IP networking allows PSAP connections to be "looped" through multiple PSAPs such that if a connection is interrupted, the network will automatically and instantaneously redirect traffic around the other side of the "loop." Because of the shared nature of IP connections, the operational cost of each application is reduced.

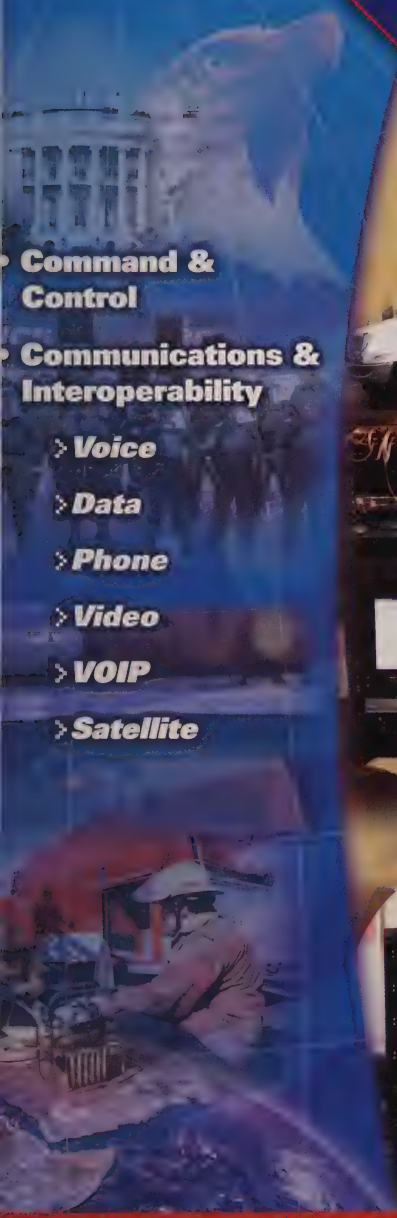
Ultimately, costs for CAMA connections and hardware can be eliminated, resulting in additional cost savings. In addition, the multifunctional nature of IP hardware makes the cost of IP switches and routers significantly more cost effective than telephone switches and selective routers.

State and regional authorities should become familiar with IP-based E9-1-1 systems and consider requiring IP-based solutions and future path plan compliance when new systems are needed. To use an automotive analogy, what we have today is a 1950s-era Volkswagen with a lot of add-ons. What we need is the hydrogen fuel-cell-powered car of tomorrow. While it may not be fully deployed today, it does exist and it does work. Likewise, E9-1-1 systems should be based on the best technology we have available today, not a souped-up version of yesterday's wonders. ■

Guy Roe is a senior consultant with MapInfo Corp. You may contact him at groe1@twcny.rr.com.

BUILT FOR THE FUTURE...

Prepared for today.



- **Command & Control**
- **Communications & Interoperability**
  - **Voice**
  - **Data**
  - **Phone**
  - **Video**
  - **VOIP**
  - **Satellite**

For today's mobile telecommunications, CALL L-3 FIRST!

508.791.1950 • www.wolfcoach.com

-Since 1967-

L3 communications
Wolf Coach

CIRCLE #75

Have you Checked your NOISE FLOOR Recently?

By Gary Hartman

Does the following scenario seem familiar? Your municipality's communications infrastructure is 20 years old ... Portable radios are barely audible in some parts of town, and even the mobile radios have issues in some areas. And this is just when the radios are working ... Much of the time, they're in shop getting fixed.

You know almost all your equipment needs to be replaced, but how do you ensure that your town will get a system that functions adequately for the large amount of money you will probably spend?

For years, operators in the highly competitive cellular world have known the value that propagation software provides for solving basic coverage concerns. The land mobile radio world has begun to apply the technology when factoring system coverage; however, users must be aware that the software is only as good as the data placed into it. In other words, GIGO (garbage in, garbage out).

Two important parameters need to be established before using propagation software. First, the "link budget," the sum of all system gains and losses in the transmit power, needs to be defined and checked against reality. The second parameter is the target signal strength required to achieve reliable coverage within the coverage area.

For cellular carriers, these factors are well known and readily understood. For the two-way radio world, there appears to be very little research that addresses either of these important parameters. Engineers have extended their cellular expertise to the public safety environment, examining what the parameters for this sector.

Table 1: Typical UHF Base Station (Outbound) Link Budget

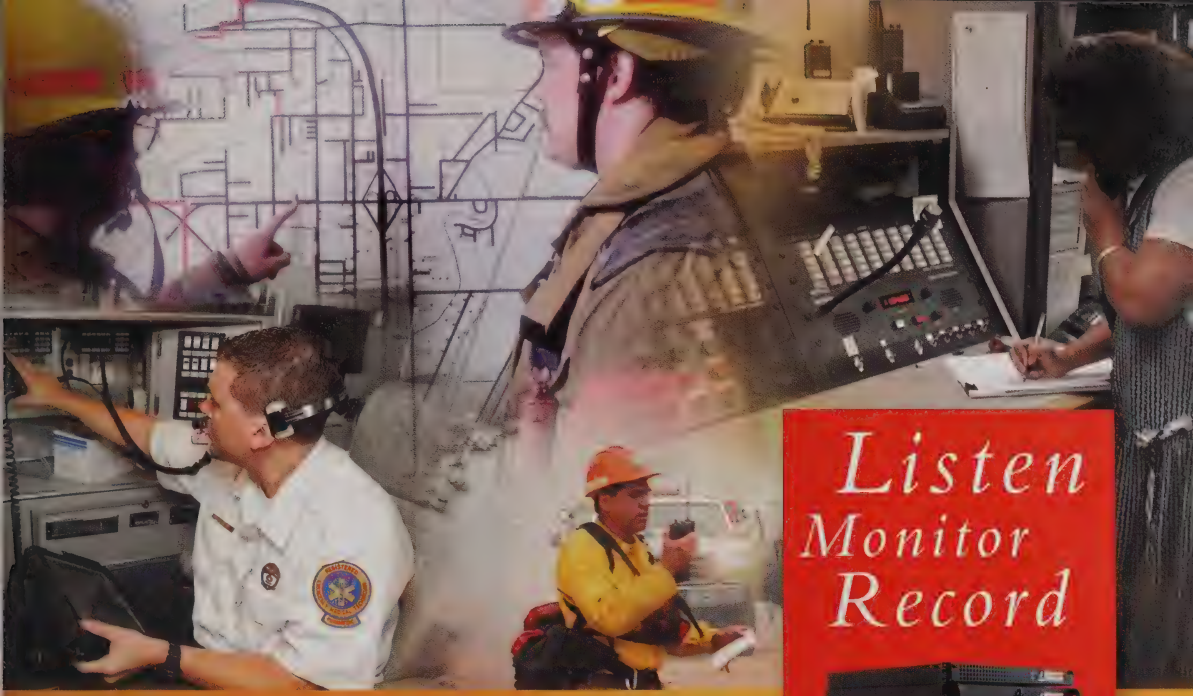
Network Element	Gain/Loss	Antenna System Gain/Loss (dB)	Power (dBm)	Power (Watts)
Base Station TX Power	--	--	50.0	100
Coax Cable	Loss	-2.0		
Jumper	Loss	-1.5		
Lightning Protector	Loss	-0.5		
Antenna	Gain	9.0		
System Gain/Loss	**Gain**	**5.0**	**5.0**	
Effective Radiated Pattern (ERP)	--	--	**55.0**	**316**

Table 2: Typical Mobile Link Budget

Network Element	Gain/Loss	Antenna System Gain/Loss (dB)	Power (dBm)	Power (Watts)
Mobile Unit Power	--	--	47.0	50
Coax Cable	Loss	-1.0		
Antenna Gain	--	0.0		
System Gain/Loss	**Loss**	**-1.0**	**-1.0**	
Effective Radiated Pattern (ERP)	--	--	**46.0**	**40**

Define the Link Budget

Determining a radio system's link budget is the first step to developing



ADVANCED RECORDING SOLUTIONS FOR PUBLIC SAFETY

Introducing the NEW TRU-IR™ Feature –

Playback any part of a call while it is still being recorded

Hindsight-Net-V6™ Series Logging Recorder

Windows OS
SQL Database
Commercial Off The Shelf Parts (COTS)
Easy to User Windows Explorer like Environment
Integrations for Most Digital PBX Systems
Fully Compatible with **EARS™** Instant Recall Recorders
Supports Redundancy and Fault Tolerancy
Raid 1, Raid 5 and NAS Options Available
Trunked Radio Integrations Available
Multiple Recorder Configurations w/Central Archiving

EXACOM®

USA - Corporate Headquarters
99 Airport Road, Concord, NH 03301
Tel: 603.228.0706 Fax: 603.228.0254
http://www.exacom.com
e-mail: exasales@exacom.com

Copyright © 2004 All Rights Reserved by EXACOM, INC.

an accurate coverage model. The link budget is simply the transmit power adjusted by all passive gains and losses between the output connector of a transmitter and the input to a receiver.

The propagation software should determine the path loss between a transmit antenna and a receiver antenna; it's up to you to determine the other parameters such as cable losses and antenna gains. The goal is to determine the actual power radiated by the antenna toward the radios in the field. Table 1 is an example of the typical UHF link budget. For convenience, the link budget uses dBs for gains and losses and dBms for actual power levels, which allows you to add and subtract gains and losses directly.

One size does not fit all in the land mobile world. The majority of mobile two-way systems are limited by the inbound (talk-in) path. And the difference between the mobile talk-in vs. the portable is also very pronounced.

Since the portable has the lowest power, portable coverage almost always becomes the limiting factor of coverage. Typical UHF link budgets are indicated in Table 2 for a mobile transmitter and in Table 3 for a portable transmitter. When you compare Table 2 with Table 3, there is almost a 10 dB difference between the talk-in capability of a mobile vs. portable radio.

Given the imbalance between the talk-out and talk-in paths, receive-only receivers (satellite receivers) can be deployed in a system design where the best quality received signal is "voted" for receiving and/or repeating through the base station's transmitter.

Target Coverage Levels

Exactly what minimum coverage level is needed to achieve reliable communications? It is well known that most modern radio receivers have good sensitivity (or at least 12 dB SINAD operation) down to a -120 dBm input. So, one might think that a target level of -110 dBm, which provides a 10 dB margin would provide reliable communications.

With this assumption mind, consider the following example: A township located next to a large city in the Northeast operates a UHF repeater system. The township's terrain is relatively flat and covers a 12-square-mile area. A full repeater is located at the public safety building, with two additional satellite receivers at either end of the township.

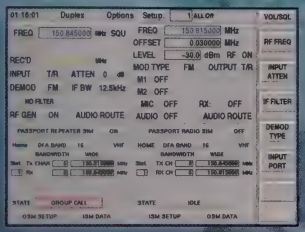
Using -110 dBm as the target level for acceptable coverage and the base station outbound link budget in Table 1, mobile link budget in Table 2, and portable link budget in Table 3, coverage maps were generated for low-noise talk-out, low-noise mobile talk-in, and low-noise portable talk-in. According to the maps, the township should have complete portable talk-in coverage well beyond its borders. Unfortunately, this was *not* the experience that the township was having with its communications. Clearly, there were other factors at work.

To better understand the environment, a trial in the township was performed using a computer-controlled communications receiver and a GPS unit. This data was useful in two ways. First, data collected while the transmitter was keyed was used to tune the propagation software to better model the actual levels achieved in the field. Second, data recorded while the transmitter was not keyed proved to be the most valuable. This data represented the

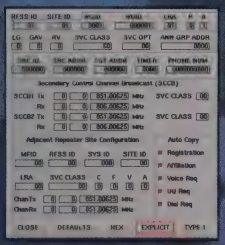
CIRCLE #77

TAP™
Levels the terrain for
rf Design Professionals
• Software used by consultants, dealers, industrial, commercial, homeland security
• Software for land mobile, SCADA, microwave, spread spectrum
• The Wright choice for complete control of your rf system design
Terrain Analysis Package (TAP)™
www.softwright.com
+1-303-344-5486 sales@softwright.com
See Us at IWCE CIRCLE #78

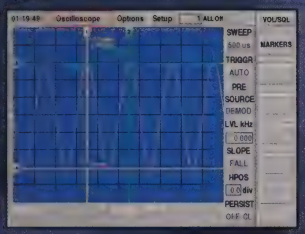
Need Advanced P25 and PassPort® Tests, Now?



Now you can test PassPort® Radios and Repeaters with the click of a mouse. With Option 19, the IFR 2975 is transformed to test protocol and radio performance parameters including PassPort® VHF systems. Save your test setups for fast future testing!



Now you can test the latest in VHF/UHF P25 Trunked Radios with Explicit Messaging Option 22. This function allows advanced control channel configuration to handle explicit channel assignments. Users can select Unit to Unit/PSTN call support as well as SCCB and Adjacent Status Broadcast messaging.



Now you can easily configure scope markers. Configurable as either vertical or horizontal markers, the IFR 2975 provides up to 4 markers for setting and viewing amplitude and frequency parameters of audio signals from the dual channel inputs or from receiver demod.

Now you have the power to test your radio systems like never before with the IFR 2975 Project 25 Test Set. It is specifically designed for speed, accuracy and automation — **saving you time and money**. With the latest digital signal processors and an exclusive built-in computer, the IFR 2975 gives you advanced tests for:

- **New** PassPort® test capability
- Explicit P25 trunking
- AES (Advanced Encryption System) and DES
- Encryption key management
- Linear simulcast modulation
- CQPSK analysis
- VHF/UHF/700/800 MHz P25 trunking with new explicit messaging support
- SmartNet™/SmartZone™
- Auto-Test
- P25 message logger
- Audio spectrum analyzer
- LTR® trunking

Call Aeroflex today and receive a FREE IFR 2975 Info Pack and Data Sheet.

Call 1-888-437-8378 or visit **www.aeroflex.com/p25testing**

AEROFLEX
A passion for performance.

Visit the IFR 2975 web site **www.P25.com**
Visit us at IWCE 2005 booth # 9021

www.aeroflex.com

CIRCLE #79

noise floor of the environment.

The trial identified 492 points in close proximity to the actual transmitter where the signal level could clearly be separated into keyed and non-keyed values. The average of the non-keyed values was taken to establish the actual noise floor environment of the area where the system is in operation. This data is shown in Table 4.

Table 3: Typical Portable Link Budget

Network Element	Gain/Loss	Antenna System Gain/Loss	Power (dBm)	Power (Watts)
Portable TX Power	--	--	36.0	5
Coax Cable	Loss	0.0		
System Gain/Loss	--	**0.0**		
Effective Radiated Pattern	--	--	**36.0**	**5**

Table 4: Noise Floor RSSI

Number of Points Examined	Average Noise Floor RSSI	Standard Deviation of Points	Highest RSSI Measured	Lowest RSSI Measured
492	-101 dBm	3.79	-90.0	-112.2

The average noise floor in this area turned out to be a whopping -101 dBm. Now, the target receive level needed to be adjusted to -90 dBm, to achieve 10 dB over the noise floor, which produced very different plots for the three cases.

What a difference 20 dB can make. These plots clearly showed coverage issues in several areas of the township for portable talk-in that correlate to actual reported communications failures. This paints a more accurate picture of the communications environment in this township. So, three new satellite receiver sites were added to the model, creating a system design that provides reliable coverage within the township borders. The additional receivers (for a total of six receivers, a receiver density of two square miles per receiver) produced the plot in Table 4 on page, which indicates there is reliable portable talk-in coverage for most of the township's borders.

In this example, if the area had been located in a low-noise environment where the equipment sensitivity of -120 dBm would be the limiting factor for reception, a single base station could provide reliable coverage well beyond the township. Since the noise floor environment was in close proximity to a major urban area, however, the noise floor environment is the overriding factor for reliable reception.

Conclusion

To accurately predict coverage with propagation software requires complete knowledge of the proposed system's operating environment. Precise link budget and noise floor numbers are a must to produce accurate coverage predictions. Without knowledge of these parameters, any propagation plot must be viewed with suspicion. In many cases, the process used to arrive at these numbers is beyond the capabilities of not only the organization purchasing the system but also the expertise of the two-way vendor supplying the equipment.

Hiring a seasoned engineering consultant can be worth the additional expenditure, considering the cost of purchasing a completely new system designed and installed with false coverage assumptions. ■

Gary Hartman is a senior engineer with V-COMM, a full-service engineering firm providing a wide range of RF and networking services to the public safety and commercial communications providers and operators.

RadioResource MissionCritical COMMUNICATIONS

News Briefs
Events Calendar
Issue Highlights
Industry Links
Reader Service
Media Kit
Subscribe/Renew

online

www.mccmag.com

"Turnkey installation is an important issue on all our tower projects.

When working on a public safety tower project, it is critical that the company we choose to supply the tower does more than just sell us the steel. Sabre Communications does just that — supplies the tower, installs the foundation and coordinates erection of the structure all with a very competitive price. We work with Sabre because we know they will give us the customer service we need to get the project done on time and within our budget."

Rey Freeman
Communications Manager
GeoComm, Inc.

Sabre
Communications
Corporation ™

2101 Murray Street • PO Box 658
Sioux City, IA 51102-0658
www.sabrecom.com
1-800-369-6690

See Us at IWCE CIRCLE #80

PROJECT MESA

Mobility for Emergency and Safety Applications

By Paul Reid

In the face of an emergency, today's communications systems are inadequate. No single technology exists that is capable of supporting an effective response to a disaster, which is normally characterized by severe disruption to public telecommunications infrastructure and electricity supplies. Nor do the means exist to bring suitable technologies together effectively in such a situation.

For example, while a fire department may have adequate communications to perform day-to-day operations, that same department may find itself unable to communicate with units from other public protection and disaster relief (PPDR) organizations such as the police when responding to a large-scale emergency in a neighboring city. Safety agencies throughout the world are now acutely aware that if they are to do their job properly, they need better technology, improved interoperability, comprehensive planning, and enhanced international standards.

Enter Project MESA

Project MESA (Mobility for Emergency and Safety Applications) is a public safety partnership established to coordinate and develop digital mobile broadband technology that would dramatically improve the efficiency of first responders and rescue squads. A transatlantic, cooperative initiative, Project MESA was established in 2000 by the European Telecommunications Standards Institute (ETSI) and the North American Telecommunications Industry Association (TIA). These two founding organizations have since been joined by radio and networking experts from a wide range of sectors, including law enforcement, firefighting, homeland security, national and international crime and terror investigation, emergency and medical services, and disaster response (including mass destruction and bioterrorism).

Project MESA represents the first international initiative to bring users and organizations from the public protection, disaster response, and civil defense sectors together with industry in the development of global telecommunications standards for public safety applications. The logic behind the emphasis on user involvement is quite simple: Nobody understands the operational requirements of the various PPDR disciplines better than the users themselves.

Project MESA's work is intended to provide for data transport at rates and mobility beyond what is currently available. A MESA-capable communications system would directly improve the effectiveness of law enforcement, disaster response, firefighting, emergency medical services, and peacekeeping, providing the basis for public safety data systems into the next decade. It would be shared by all emergency services to communicate with one another and share information and resources.

Project MESA currently has more than 100 members comprised of industry, associations, and agencies from around the world who perform the technical work to develop the required capabilities and specifications. Members meet every six months (alternating between North American and European venues) to coordinate program activities and to review documents for approval. Between meetings, they primarily rely on electronic working methods to coordinate specification development and other activities. User professionals from both North America and Europe are participating in the project, which receives input from other parts of the world as well; Canada and Korea send observers, and Japan also has exhibited a strong interest.

Revolutionary Technology

Based on digital wireless technology,

MIDLAND'S RoIP SOLUTION YOUR BEST VALUE

- **Interoperability**
- **Maximum Flexibility**
- **Minimum Investment**
- **System and Frequency Transparent Solution**
- **Best Value in the Marketplace**

Upgrade your existing system into a cost-efficient communication center with **RoIP (Radio-over Internet Protocol)** from Midland.

Midland offers the most sensible interoperability solution available without sacrificing performance.

If you want to take full advantage of all the features and flexibility of the Midland RoIP system, we also offer a turnkey solution with the Base Tech II base station and IP controller.

For more information, see us at IWCE Booth #3001 or visit our web site: www.midlandradio.com

MIDLAND®
RADIO CORPORATION

1120 Clay Street
North Kansas City, MO 64116
(816) 241-8500 • www.midlandradio.com

© 2005 Midland Radio Corporation

Visit us at IWCE Booth #3001

RoIP • Base Stations • Repeaters • Portables • Mobiles • AVL

CIRCLE #81

MESA systems will enable communications at broadband speeds far beyond the scope of current wireless standards. The intelligent networks will be ad hoc self-healing, in that network connections will be established automatically once units arrive on the scene and will be maintained even if one or more units becomes inoperable. With MESA, all resources employed in tackling a disaster will have interconnectivity, no matter which service or what country they come from.

The system could involve area-wide deployments of infrastructure covering specific geographic areas or roving hot spots. Typical data applications would include the transmission of vital information about patients, robotic control, video monitoring, suspect identification, the sensing of hazardous material, the transmission of building maps and plans, and other crucial information.

Imagine a fictional disaster in which a tall building is on fire, for example. Fire engines, ambulances, police cars, and surveillance helicopters are en route to the scene. Electrical power has been shut off in the area, and mobile and wired phone systems are out of service, overloaded by frightened and worried citizens. With MESA equipment on board, all units, including those in the air, will automatically establish a shared, high-speed wireless network as soon as they approach one another.

With current technology, from the moment a firefighter enters a blaze, his only connection to the person in charge is a narrowband radio, if that. With MESA equipment in his backpack, that firefighter could be closely monitored from outside the building. Streaming video from his helmet, along with vital-signs data such as his heart rate, body temperature, blood pressure, and remaining oxygen, would appear on monitors inside a master vehicle.

Further advanced services supported by this new technology include the immediate treatment of casualties supervised by remotely located specialists and the deployment and control of mobile robots to retrieve victims from dangerous places. Add to these capabilities robust voice communications, and the possibilities are endless.

Based on digital wireless technology, MESA systems will enable communications at broadband speeds far beyond the scope of current wireless standards.

A Matter of Increased Urgency

The initial goal of Project MESA was to develop a completely new communications system, perhaps over the next decade. But with Sept. 11, 2001, came the sudden realization that such a system was already long overdue, and Project MESA shifted its focus to producing solutions based on existing technologies and infrastructures that could be applied more immediately.

In 2002, Project MESA published its first Statement of Requirements (SoR), providing an overview of applications and services requiring a very high bit-rate mobile platform. The document offers insight into the unique working environments of the public safety user community with the goal of helping industry develop and provide the most effective and accurate technical solutions.

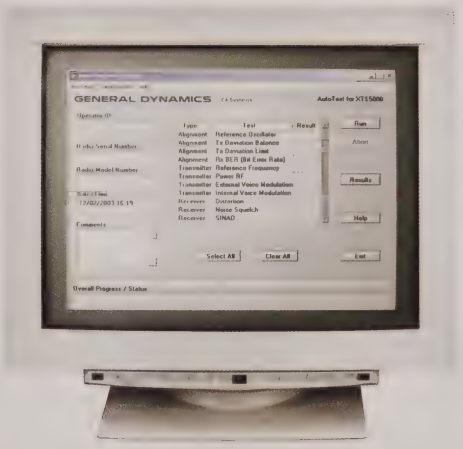
These requirements — defined by users and based on scenarios and analyses of real-life events — outline advanced mobile broadband scenarios and define the services to be supported by broadband public safety mobile telecommunications networks. The requirements of a MESA-capable system can be broadly summarized as follows:

- A mobile broadband, shared network that multiple users can simultaneously access using multiple applications, in a specified geographical area, independent of the availability of public networks and the supply of commercial electrical power.
- A highly mobile wireless network that supports high data rates and varying bandwidth, offering self-healing characteristics and secure network access.
- Priority and reliable service to public safety agencies, ubiquitous coverage within a service area, and possible secondary service to other commercial clients.

The information provided in the SoR has been organized into a logical framework to identify the common technical requirements across the different PPDR scenarios. For example, the communications requirements (such as bandwidth, latency, etc.) of firefighters responding to a house fire may be similar to those of police officers responding to a traffic accident.

Although this systems engineering

Instant wait loss.

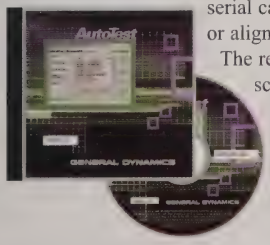


Recently updated to improve operation with legacy analyzers

Introducing AutoTest Automated Test and Alignment Software.

In ***as little as 10 minutes,*** the AutoTest Software automatically determines the type of radio you want to analyze – and then performs manufacturer-specified alignments and basic tests for you.

Simply install AutoTest software onto your computer; connect your computer, analyzer and radio together via serial cables; and select the tests or alignments you wish to run. The results will appear on the screen in an easy-to-read format. AutoTest software saves every test you conduct by radio serial number in a Comma Separated Variable (CSV) format. So the next time you test the same radio, its history is at your fingertips!



Currently, AutoTest software supports Motorola XTS5000™, XTS3000™ and ASTRO® Saber™ digital portable radios, as well as ASTRO® Spectra™ and ASTRO® Spectra Plus™ mobile radios. Contact your General Dynamics Test Equipment representative at 877-449-0600 for availability of other models. Or visit www.gdds.com/autotest. Start losing wait today. You'll notice the difference almost immediately.

GENERAL DYNAMICS
Strength On Your Side™

© 2005 General Dynamics. All rights reserved. All other product or service names are the property of their respective owners. Reg. U.S. Pat. & Tm. Off. Printed in the U.S.A. General Dynamics reserves the right to make changes in its products and specifications at any time and without notice.

Project MESA is well on its way to developing coordinated technical specifications supporting the deployment of next-generation mobile broadband digital communication capabilities for public safety and emergency response applications.

has taken considerable time, such an approach simplifies the evaluation of the SoR data and supports the development of a streamlined set of specifications that satisfies the seemingly incompatible communications needs of the various PPDR scenarios.

The Technical Specifications

Throughout 2003, Project MESA refined the SoR based on additional user input. Now, its focus is shifting toward the exciting task of making technology choices and developing standards. Project MESA's Technical Specifications Group-Systems (TSG-SYS) is currently mapping the SoR into a technology requirements document. The process includes surveying existing technologies that show potential for meeting the requirements and filtering through the scenarios that serve as a basis for technology selection. Once the technologies have been selected, standards will be produced defining the new system.

The resulting technical specifications and technical reports for the first phase of a mobile broadband system will include:

- Mobile Layer 1 (PHY) supporting bit rates above 2 Mbps
- MESA core network
- Mobile Link Entity (MLE) and ad hoc networking capabilities of self-healing wireless infrastructure nodes as integral parts of a MESA core network
- Terminals for access to the above
- System and service aspects

To complement the MESA terrestrial broadband system and extend the network from a local to a wide area, the MESA plan also includes

www.GenesisWorld.com
Genesis

You have paid millions to get the very best Trunking system in the world.
Do you REALLY know what's happening on your system?
How do you manage it?

Genesis brings you the software tools and the experience to help you get the very most from your Motorola Trunk system investment.

Management Tools for Serious
SmartZone® SmartNet®
Trunking Operators

1-877-548-0465
1-903-561-6673

See Us at IWCE CIRCLE #83

broadband satellite systems such as INMARSAT and high-altitude platform systems (HAPS) for airborne platforms.

A System of Systems

At the seventh meeting of Project MESA in September 2003, in Milan, Italy, the group acknowledged that the need to interface with a variety of existing systems will drive a multiplicity of technologies. Public safety organizations may require communications to operate on a variety of networks and systems, from wireless local area networks (WLANs) to commercial networks such as third-generation (3G) mobile. As a result, the group has adopted a "system of systems" approach that takes into account the fact that Project MESA is likely to embrace technologies from multiple sources.

As work continues, the project is narrowing down possible technology candidates to a manageable number. The project has adopted a technology-neutral approach, and is examining all possibilities, including commercial technology and systems and new technologies that are still under development.

Project MESA is well on its way to developing coordinated technical specifications supporting the deployment of next-generation mobile broadband digital communications capabilities for public safety and emergency response applications. It will finalize initial drafts by the middle of this year. This "technology roadmap" will identify technologies that satisfy Project MESA technical requirements and, where technologies are unavailable, recommend specific areas for technical research.

When complete, the roadmap will be utilized in the drafting of final Project MESA capabilities and specifications for regional development and publication by ETSI and the TIA. Other technical organizations and entities also would be encouraged to consider MESA specifications and the resulting standards. These might include the Third Generation Partnership Projects (3GPP and 3GPP2); other ETSI and TIA committees such as TIA TR-8.8 Engineering Subcommittee, responsible for broadband data systems, and ETSI Project TETRA, responsible for standards for terrestrial trunked radio; ETSI's emergency telecommunications and security committees; and international standards-making bodies.

Project MESA capabilities and regional standards will be utilized in government-owned systems, government/private sector partnerships, and other applications, enlarging the market and giving first responders the capabilities they need to serve and protect on a local and international level.

At this crucial stage, emergency authorities and those in the telecommunications industry can help shape

Secure, coordinated front line communications.

When emergencies require a coordinated response by multiple services and agencies, call on secure, reliable satellite communications from MSV. Our network supports voice and data communications anywhere an emergency occurs. And our unique dispatch radio capabilities and scalable talkgroup capacity means all responders can be on the same wavelength whenever and wherever homeland security demands it.

1-800-216-6728 www.msvlp.com

MSV
Mobile Satellite Ventures

See Us at IWCE, Booth 14037 CIRCLE #84

the future of MESA, and the group welcomes the input of relevant manufacturers and PPDR users. It is essential that all interested parties have their say to ensure the specifications meet every anticipated need.

The number of members participating in the project is increasing with every meeting. For Project MESA, the challenge ahead is to incorporate user input effectively into its technology capability requirements so that the full potential of MESA can be realized. ■

Paul Reid is promotion team manager for the European Telecommunications Standards Institute (ETSI) in France. Contact him at paul.reid@etsi.org.

Participation in the work of Project MESA is open and free to any member organization of ETSI and TIA. Individuals representing public safety and government organizations also can become public safety members. For more information, visit www.projectmesa.org/ or the MESA-ETSI portal site, http://portal.etsi.org/mesa/. 3GPP is a trademark of ETSI registered for the benefit of the 3GPP Organizational Partners.

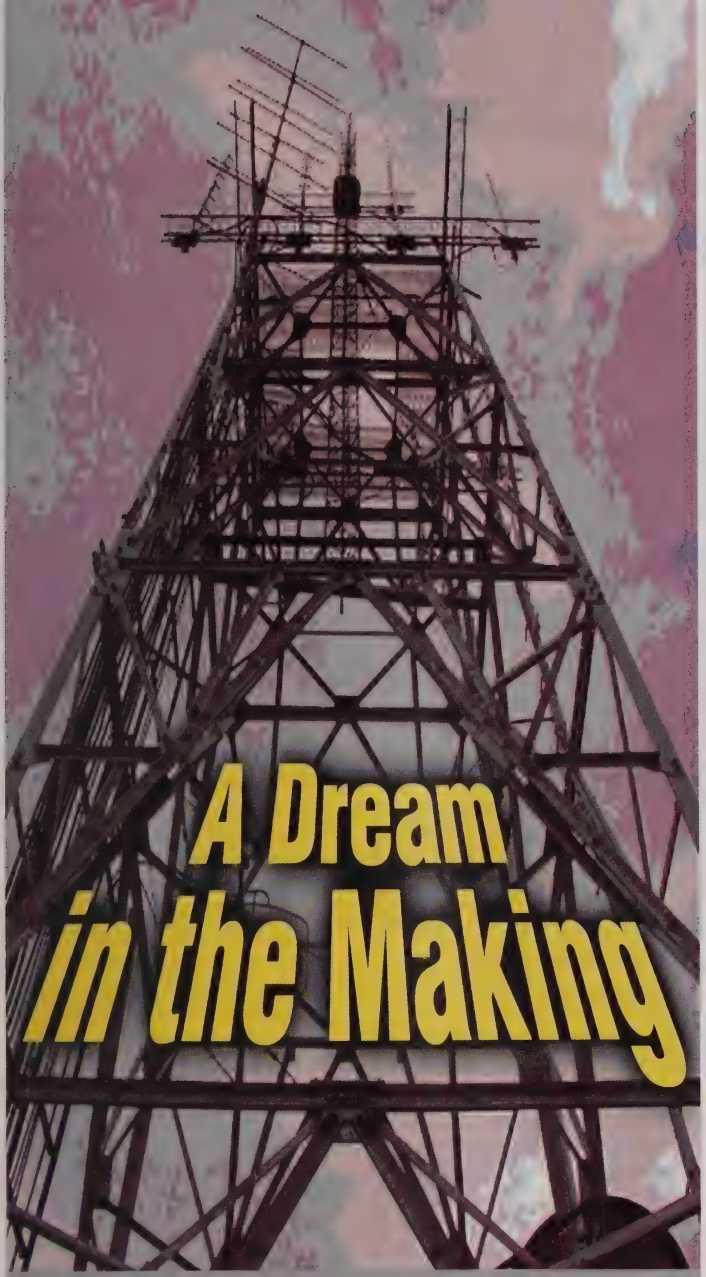
The Potential Applications

The areas of public protection and disaster relief which could benefit from MESA technology are numerous:

- ***Disaster relief.*** A growing demand for mobile broadband services within telemedicine, firefighting, mobile robotics, and peacekeeping operations is rapidly emerging.
- ***Remote patient monitoring.*** One of the key aspects of crisis and disaster management is the effectiveness of front-line medical assistance to the injured. The concept of remote patient monitoring is the subject of intense study in both the civil and military peacekeeping sectors, where the need for a reliable, secure, and very high-capacity mobile technology has been identified to address activities at the scene of an incident.
- ***Mobile robotics.*** Mobile robotics is also a subject of active study in both the public safety and military sectors. Robots designed on both the micro and macro scales can assist in the rescue of people from hazardous areas, provide for automated inspection of non-accessible areas, offer the safe and swift clearing of explosive devices, and help resolve terrorist actions. Again, all of this depends on the application of a highly reliable, broadband wireless technology.
- ***Broadband satellite constellations interconnection.*** MESA also is considering interconnection to one or more of the planned broadband satellite constellations to ensure a stable communications path from remote areas where terrestrial infrastructures fail during natural disasters or man-made destruction.

Havis-Shields
Vehicle Specific Console™
E-Series Van
New
Fits new Ford E-Series Vans
Replaces OEM engine cover console for proper mounting of emergency controls
Removes easily for fast engine service
www.havis.com • 1-800-524-9900
See Us at IWCE, Booth 2051 CIRCLE #85

MOVING?
Visit our Web site
www.mccmag.com
and update your address



A Dream in the Making

Arizona is one step closer to implementing a long-awaited statewide, interoperable radio system.

By Art Coughanour

Thanks to a surprise appropriation last spring from the Arizona State Legislature, senior officials at the Arizona Department of Public Safety (DPS) are optimistic that their dream of a statewide, interoperable radio telecommunications system is one step closer to becoming a reality.

Their optimism stems from the legislature's approval of an unexpected $2 million allocation during the waning moments of the 2004 legislative session. The legislation — sponsored by Rep. Steve Huffman (R-Tucson) — authorizes the establishment of the Arizona Public Safety Communications Advisory Commission and provides funds for the staffing of the commission. The system recently received another $3 million boost when the state economy reached additional projected revenue triggers.

The commission, which replaces the Arizona Public Safety Communications Committee, will align itself within the operational umbrella of DPS and function within the model guidelines established by a 12-member committee consisting of representatives from police, fire, and sheriff's departments, along with personnel from emergency management and emergency medical services.

With the much-appreciated $2 million appropriation in hand, DPS is now in the process of recruiting and developing a commission staff whose primary responsibility will be to move public safety radio telecommunications in Arizona into the 21st century. The goal is to provide public safety entities in Arizona access to a seamless and integrated communications system, not only during times of crisis,

A Dream in the Making

but for daily operations as well.

Replacing the existing radio telecommunications system won't be a quick or inexpensive process; it most likely will cost some $300 million to develop and implement. If consistent funding is forthcoming through state and federal grants, there is hope that this statewide communications enterprise will be operational within the next six years.

Spending money to retrofit old systems is unwise and has no long-term value.

Although the combined $5 million is just a start, it has provided DPS with the resources to begin staffing the commission.

"It also will allow us to begin the serious planning and engineering work that is required for such a complex system," says Lt. Col. David Felix, assistant director of the department's Criminal Justice Support Division.

The DPS has initiated a nationwide search for an executive director of the commission, who will participate in the hiring of a project manager, three telecommunications engineers, a technical writer, a communications specialist, an executive assistant, and an administrative assistant.

"Moving forward with this project is something we have been envisioning for the past few years," Felix says. "We are quite excited about the support and the funding we have received from our public safety partners, the legislature, and Governor Janet Napolitano. We are now ready to move forward, and we urge those who want to get in on the ground floor of this project to contact us. We have numerous positions to fill, both within the commission and within the department."

The commission will continue the work of the Arizona Public Safety Communications Committee, Felix said. Its staff will foster, recommend, and develop technical standards, oversee conceptual and detailed design efforts, and pursue funding to build and maintain a statewide system for use by all local, state, tribal, and federal public safety entities in Arizona. The commission will continue to work closely with all public safety entities to ensure that this system design will meet the needs of these groups, he explains.

A Seed is Planted

Arizona's journey toward communications interoperability began some 40 years ago when current DPS Director Dennis Garrett was a rookie cop with the Phoenix Police Department.

"When I came out of the Phoenix police academy in 1964, I was told that we would have a system [in which] all you would have to do is switch to a specific channel on the radio and you would be able to communicate with a highway patrol officer, a deputy, or another law enforcement agency," the director reminisces. "But here we are in the 21st century, and we still can't do it. I think this appropriation is a substantial step in that direction."

The reality of the concept first started taking hold at DPS the spring of 1996 when the department introduced Project Crystal, headed by DPS Commander Terry Conner. At that time, DPS was on the doorstep of developing Project Crystal, a digital trunking-based communications system designed to allow field officers to communicate with each other and personnel from other public safety agencies without patching or deploying some other stop-gap measure. This was to be accomplished simply by switching to a predesignated channel.

When the department introduced this concept, the state's economy was rolling along, but before the idea received legislative approval, the state's economy, as well as the nation's, turned south. As a result, Project Crystal was shelved and remained in storage until last spring when the legislature approved the $2 million appropriation.

From Dream to Reality

When Garrett arrived at DPS in January 2000, one of the first things he did was push for the establishment of what became the Arizona Public Safety Communications Committee a few months later. This volunteer, ad hoc committee of public safety executives was formed to address the short- and long-term interoperable communications needs of public safety entities within the state. →

Since its formation, Felix reports the committee has met regularly, and on a quarterly basis. During this process, three subcommittees emerged. The Technical Subcommittee designed the statewide public safety communications network, while the Funding Subcommittee was responsible for procuring additional funding. The Legislative and Community Outreach Subcommittee generated information and educational materials to help capture public and legislative support.

One of the first tasks the committee representatives addressed was meeting with Arizona's congressional delegation in Washington, D.C. With primary assistance from Sen. John Kyl, (R-Ariz.), the committee received a $500,000 federal grant, a portion of which DPS used to contract with Macro Corp. to conduct a statewide radio interoperability needs assessment.

Macro Corp., a Pennsylvania-based engineering consulting firm, was to evaluate current and future needs of all public safety and state departments operating in Arizona. Additionally, the company was to develop at least three system configurations with cost estimates and recommend a specific statewide emergency voice radio network.

After interviewing 118 public safety agencies in Arizona, Macro provided the committee with two reports, which were presented to the Joint Legislative Budget Committee. The first report detailed the telecommunication needs of 118 potential participants, while the second offered insight into three viable system configurations.

In its evaluation, Macro said there were as many as 200 telecommunications networks functioning within Arizona, the majority of which were designed more than 20 years ago.

"With some exceptions, there were really no significant differences between state, county, city, town, fire district, or tribal systems with regard to coverage, reliability, interoperability, age, audio quality, or grade of service," the report stated.

Further, "Most systems are in the VHF and UHF band and do not conform to FCC refarming rules," the report stated. "The manufacturer no longer supports a lot of the fixed equipment, and spare parts are becoming very scarce. It won't be long before some components or subsystems will not be available, and major retrofit costs are necessary. Spending money to retrofit old systems is unwise and has no long-term value."

In its report, Macro recommended three potential system configurations. The first calls for the deployment of a digital UHF trunked system at a cost of $277.4 million; the second is a recommendation for a hybrid digital UHF and 700 MHz trunked system at a cost of $289.5 million; and the final calls for a digital 700 MHz trunked system at a cost of $320 million.

The Macro report stated time is of the essence due to the current condition of DPS' microwave network and other fixed infrastructure operated by state, county, and local governments. The report also added that if the state started the design process by October 2004, the project could be completed by "mid-2010." Which will be none too soon.

"The 1950s and '60s technologies and infrastructures used in Arizona were workhorses which fortunately survived well beyond their anticipated life cycles," Felix says. "We need to move forward into the 21st century, and a radio telecommunications interoperability system is a giant step in that direction." ■

Art Coughanour is publications editor for the Arizona Department of Public Safety.

For more information about the Arizona Public Safety Communications Advisory Commission, visit the department's Web site at www.dps.state.az.us.

Mobile Command
Dispatch Operations
First Responders
Radio Control Console
with Cross-Banding!
NCS-C250 Mobile Multi-Switcher
Dimensions
1.8" H x 6.4" W x 7.1" D
The Mobile Multi-Switcher from NCS is a unique interoperability solution for Public Safety professionals. The unit connects four radios to one microphone and two speakers and includes cross-band repeating and selected & unselected audio control. Options include COR, Hook-Switch and Multi-Cast. Multiple units in series control eight or more radios. Radio interconnect cables are also available.
Typical Application
888.883.5788--- rr@ncsradio.com --- www.ncspsc.com
New Communications Solutions
Visit Us at IWCE Booth 11075
See Us at IWCE, Booth 11075 CIRCLE #86

WHAT'S NEW

Wireless LANs, Modems, and Data Antennas

In this issue of *MissionCritical Communications*, we tackle the wireless data product category, offering information on wireless local-area network (WLAN) equipment, wireless modems, and wireless data antennas. For additional information on any of these items, please use the reader service card on page 155, or for faster response, visit our Web site at www.mccmag.com and click on "Reader Service."

Berkeley Varitronics Systems

The Yellowjacket calibrated wireless test receiver module interfaces with HP's iPAQ PocketPC to sweep and analyze 2.4 GHz Wi-Fi networks. It measures all 14 OFDM/DSSS 802.11 b/g network channels, allowing users to determine access points' MAC, SSID, and RSSI signal levels. Utilizing a custom receiver and software, the Yellowjacket RF spectrum analysis and direction-finding tool is accurate to within 1 dB. Visit the Web site www.bvsystems.com. ***Circle #100***

BlueRadios

BlueRadios introduced a USB 2.4 GHz frequency-hopping, spread-spectrum, Bluetooth LAN Access-Point Communicator for PCs and laptops. The communicator also supports audio headsets, dialup networking, and serial data application services. The wireless device transmits data and information directly to and from other Bluetooth-enabled devices and comes standard with software for use on Microsoft Windows platforms. Visit the Web site www.blueradios.com. ***Circle #101***

BlueSocket

BlueSocket, a developer of wireless local-area network (WLAN) equipment, introduced BlueSecure, a dedicated wireless LAN monitoring and security system designed to protect networks from wireless-based attacks.

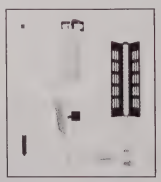
New features include active containment of wireless intrusions, advanced RF spectrum analysis, and enhanced reporting. The company also offers a variety of wireless gateways that secure and manage WLANs with network management features such as IPSec security, role-based access control, bandwidth throttling, authorization/authentication, and persistent connectivity support for roaming users. Visit the Web site www.bluesocket.com. ***Circle #102***

BlueWave Antenna Systems

Suitable for use in harsh conditions, the Summit Series antennas feature a black Teflon coating with ice-shedding properties. Other features include a broadband design, an oversized heavy-gauge boom, and a wide-diameter dipole on the offset dipoles. Antennas are available in yagi, offset, grid, and panel models. Visit the Web site www.bluewaveantenna.com. ***Circle #103***

Comtelco Industries

Comtelco introduced a variety of new wireless data antennas, the majority of which are designed for the wireless ISP market. Antennas are available for use in the 900 MHz, 2.4 GHz, 5.2 GHz, and 5.8 GHz frequency bands. Models include directional antennas such as panel, enclosed yagi, and sector, as well as omnidirectional base station antennas. Visit the Web site www.comtelcoantennas.com. ***Circle #104***

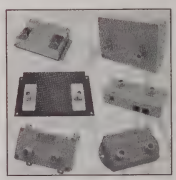


Conexant Systems

The Prism GT 802.11g and Prism WorldRadio 802.11a/g chipsets feature integrated USB 2.0 interfaces. A wide range of 802.11b/g and a/b/g client and access-point reference designs are available, including the 802.11a/b/g dual-band Prism WorldRadio MiniPCI module reference design, which has Wi-Fi certification for WMM and WPA2. Software solutions include Prism Nitro XM, which the company states increases 802.11g and a/g physical throughput. The company's wireless products are available as stand-alone solutions or in conjunction with its home network processors, DSL, and cable modem semiconductor system solutions. Visit the Web site www.conexant.com. ***Circle #105***

HyperLink Technologies

Designed for 900 MHz spread-spectrum wireless LAN and telemetry applications, the HyperAmp 900 Series bidirectional Wi-Fi RF amplifier is compatible with spread-spectrum wireless gear, including 802.11a/b/g. The unit provides 20 dB of low-noise receive gain and can be configured to deliver full transmit power with 5 milliwatts of input power, permitting cable runs of several hundred feet with no degradation in operating range, according to the company. Visit the Web site www.hyperlinktech.com. ***Circle #106***



Mentor Engineering

The BBX wireless modem features a 16-channel GPS receiver for AVL and a variety of inputs and outputs for telematic data collection. It can operate as a stand-alone unit or in conjunction with a variety of in-vehicle mobile data

SATEL

www.satel.fi

Manage your network – SATEL NMS

SATEL Oy offers you an effective way to control, adjust, and monitor your modem network. The SATEL Network Management System (NMS) is the tool to use when you want to check the status of your data network, or when it is essential to re-configure the modems, which monitor your power grid. No longer is it necessary to individually check every single modem on the spot, the SATEL NMS helps you to monitor and update the configuration, without leaving your desk.

The Network Management System from SATEL Oy is a program for managing SATELLINE radio-modem networks. With the aid of this program, the network can be managed, monitored, and configured remotely from a central location. Adjusting the parameters or changing the monitored attributes can be done effortlessly via a computer. The program is a considerable asset, especially when utilised in a large network consisting of several modems or more.

The SATEL NMS requires a personal computer running Microsoft Windows, and a network using SATELLINE-3AS NMS –radio-modems. A special NMS interface is required to connect the modem to the computer running the net monitoring program. The sub-station modems do not demand any additional equipment to run this system.

Invisible and efficient

SATEL NMS-software does not affect the normal operation of the modem, as the data it sends is "invisible" to the other applications in use and the traffic protocols don't get crossed. The NMS may, however, slightly affect the timing of the data transfer, in spite of the minimal amount of bandwidth the application uses. If the network is idle, the NMS-software can be used in offline mode that provides the program with full use of the entire bandwidth. This enables accelerated testing and configuration of the network.

The NMS requires only a small amount of bandwidth because it communicates with compact identifiers. The identifier system enables the full regulation of the modems and ensures compatibility with future models.

Using the SATEL NMS-software is straightforward. When the network of modems is being installed, the modem settings are programmed uniformly, after which the entire network can be configured from a central location. Alarm settings and other parameters can be altered effortlessly. The graphical net-designing tool makes adding modems and links easily. Once a new modem has been added to the network, the settings and routing information is automatically sent to it.

SATEL Oy
Meriniitynkatu 17, PL 142, 24101 Salo, Finland
Tel. +358-2-777 7800, Fax +358-2-777 7810
E-mail: info@satel.fi, www.satel.fi

See Us at IWCE CIRCLE #87

computers. The modem also supports several internal wireless modem options, including GPRS, 1xRTT, and iDEN, allowing users to communicate over their choice of wireless network. Visit the Web site www.mentoreng.com. ***Circle #107***

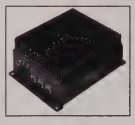
Microwave Data Systems

The MDS mobile data kit provides wireless connectivity to support a variety of applications in public safety and field force automation. The kit includes the MDS iNET 900 IP/Ethernet solution for public safety or the MDS

entraNET 900 IP/Ethernet solution for field force automation. Both kits also include MDS NETview network management software, antenna and coaxial cable, and a trunk tray and mounting bracket. They are backed by a one-year warranty. Visit the Web site www.microwavedata.com. ***Circle #108***

Padcom

A ruggedized hardware platform powered by TotalRoam software, the 8100 remote access router provides optimized, secure connectivity across wireless networks. Small and adaptable, the unit can be integrated into any fixed or



mobile environment to manage connectivity for multiple downstream devices. It keeps IP and non-IP devices seamlessly and securely connected for greater overall productivity, according to the company. Visit the Web site www.totalroam.com. ***Circle #109***

Radiall/Larsen Antenna Technologies

Radiall/Larsen offers antennas in a variety of frequencies, including VHF, UHF, cellular, PCS, and GPS, as well as high frequencies such as 2.4 GHz and 5

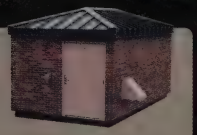
GHz. Also available is the NMO mount, which converts from low frequency to high frequency use. Suitable for public safety vehicles, the NMOHF is available in a thick mount model. Visit the Web site www.radialllarsen.com. ***Circle #110***

Radio Data Technology Ltd.

Suitable for SCADA, remote control, telemetry, and environmental monitoring, the RM96xx wireless modem operates between 400 MHz and 470 MHz.

With a typical range of several miles and a data rate of 16 kb, the modem is a stand-alone alternative to cellular. Visit the Web site www.radiodata.co.uk. ***Circle #111***

Design Flexible
PRE-ASSEMBLED COMMUNICATION & EQUIPMENT BUILDINGS



- STANDARD EXTERIORS
  Steel, Brick, Aggregate, Stucco, Split Face Block
- SHIPPED PRE-ASSEMBLED
  WITH or WITHOUT A FLOOR
- Framework design offers EASY EXPANSION without on-line operations interference
- HEAVY DUTY CONSTRUCTION
  70% LESS WEIGHT than concrete shelters

Trachte Buildings are shipped with your electrical and mechanical accessories Pre-installed

TRACHTE
800-837-5707

For more information contact Renee @ extension 246 or email: reneed@trachteusa.com
www.trachteusa.com

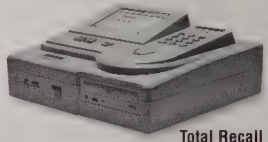
CIRCLE #88

Omnicron
Voice Logging Recorders

Providing solutions for archival voice storage and supervisory monitoring since 1975.

Automatically document telephone and 2-way radio conversations. Compact, Affordable, Easy to Install, Operate, Maintain and Purchase.

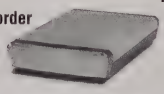
- Self-contained with Hard Drive, Network (LAN) and Dialup access or USB to PC, 2 to 16 channels ($670-$7940). Record directly to PC, 2 to 16 channels ($220-$1140).
- Up to 10,000 hours on internal hard drive with archiving to built-in or external CD/DVD
- Over 1000 resellers
- Dealer inquiries welcome



Total Recall

TeleCorder

UpCorder



omnicron

OMNICRON ELECTRONICS
581 Liberty Highway
Putnam, CT 06260
860.928.0377
Fax: 860.928.6477
www.omnicronelectronics.com

CIRCLE #89

RF Industries

RF Neulink's NL6000 radio modem employs error-correction techniques.

No increase in noise susceptibility is realized during error correction, as the process improves receiver sensitivity by directly reducing bit errors attributed to noise. The unit maintains high data rates and radio channel performance within the 12.5-kilohertz narrowband. Visit the Web site www.rfindustries.com. ***Circle #112***

Satel Oy

The Satel Network Management System (NMS) enables users to remotely

manage, monitor, and configure Satelline radio modem networks. Users can adjust parameters via their computer. There is no need to reprogram each modem individually. Visit the Web site www.satel.fi. ***Circle #113***

Seimac Limited

Seimac's SolidLink is a rugged, low-power, frequency-hopping, 2.4 GHz spread-spectrum radio that reliably transports remote data for monitor-

ing, telemetry, industrial SCADA applications, and automation. The data radio combines state-of-the-art radio technology, a compact, robust industrial design, and graphics-based network software for rapid deployment, efficient network maintenance, and long-range license free operation. Visit the Web site www.seimac.com. ***Circle #175***

Telepoint

DigiNX digital radio modems (WDS-2000i) provide wireless connectivity that simultaneously supports multi-

channel voice and data and the Internet for low- to medium-capacity, point-to-point, virtual office private networking applications. The super-use-personality (SUP) interface enables users to select data rate, interface type, and frequencies through the front-panel keypad. Visit the Web site www.telepointinc.com. ***Circle #114***

WaveRider Communications

WaveRider introduced a field-deployable wireless access network for the 900 MHz ISM band. Suitable for private networks, public safety, and emergency response applications, the wireless LAN can interface with all standard IP and telephony networks using standard protocols. Fixed and portable modem options are available, both of which are capable of providing high-speed data, VoIP, and security video capabilities. Visit the Web site www.waverider.com. ***Circle #115***

TRANSMITTER LOCATION

New fixed site direction finders provide 2 degree accuracy, and include software for triangulation from a central control site. Mobile versions also available covering 50MHz to 1 GHz
Doppler Systems Inc.
PO Box 2780 Carefree, AZ 85377
Tel: (480) 488-9755 Fax: (480) 488-1295
www.dopsys.com
European Marketing Director Denis Egan
PO Box 2, Seaton, Devon EX12 2YS England
Tel & Fax: 44 1297 62 56 90

Communications...Catch the Wave

2005 East Coast Regional
Greensboro, NC • May 2 – 4, 2005
APCO • NENA • APCO • NENA • APCO
Communications...Catch the Wave
www.ncapco.org

2005 East Coast Regional APCO Conference

May 2 – 4, 2005 Greensboro, NC

The NC Chapter of APCO and NENA invite you to the 2005 East Coast Regional APCO Conference May 2nd – May 4th at the Koury Convention Center in Greensboro, NC.

For more information, please visit our website for full details and contact information of committee members.

www.ncapco.org

Communications...Catch the Wave!!

CIRCLE #90

Portable and Mobile Radio Antennas

By Steven Bromby

Go boldly into a new frontier of data specifications. On the following pages, you will find specs on a variety of portable radio antennas starting on this page, as well as mobile radio antenna specs beginning on page 119. Some things to keep an eye on when selecting the right antenna are compatability, performance, and durability. It is important to note the frequency range; what radio(s) the antenna will function with or what connection types are needed; and that the construction materials of the antenna are appropriate to your specific work environment. If you would like more information on an item, please circle the appropriate number on the reader service card on page 155 or, for faster response, go to "Reader Service" at www.mccmag.com on the Web.

COMPANY INDEX

Antenex
IL: 630-351-9007
www.antenex.com
Circle #116

Antenna Factor
OR: 800-489-1634
www.antennafactor.com
Circle #117

Antenna Plus
AZ: 480-657-7354
www.antennaplus.com
Circle #118

Antenna World
FL: 305-471-9507
www.antennaworld.com
Circle #119

ARC Wireless Solutions
CO: 303-421-4063
www.antennas.com
Circle #120

Astron Wireless Technologies
VA: 877-567-7646
www.astronwireless.com
Circle #121

Centurion Wireless Technologies
NE: 800-228-4563
www.centurion.com
Circle #122

Childs Antennas
MN: 800-533-0998
www.childsantennas.com
Circle #123

Codan Limited
Australia: +61 8 8305 0311
www.codan.com.au
Circle #124

Comprod Communications
QC: 450-641-1454
www.comprodcom.com
Circle #125

Comtelco
IL: 630-790-9894
www.comtelco.net
Circle #126

Hirschmann USA
MD: 800-225-0524
www.hirschmann-usa.com
Circle #127

Horizon Antenna Systems
WI: 608-647-3700
www.horizonantenna.com
Circle #128

HyperLink Technologies
FL: 561-995-2256
www.hyperlinktech.com
Circle #129

Kendoo Technology
FL: 305-592-9688
www.kendoo.com
Circle #130

Mobile Mark
IL: 847-671-6690
www.mobilemark.com
Circle #131

National RF
CA: 858-565-1319
www.nationalrf.com
Circle #132

New-Tronics Antenna Corp.
TX: 940-325-1386
www.new-tronics.com
Circle #133

PCTEL — Antenna Products Group
IL: 800-323-9122
www.pctel.com
Circle #134

Polar Electronic Industries
Australia: +61 3 9555 2500
www.polarelec.com.au
Circle #135

Q-Mac Electronics Pty. Ltd.
Australia: +61 8 9242 2900
www.qmac.com
Circle #136

Radiall/Larsen Antenna Technologies
WA: 360-944-7551
www.radiallarsen.com
Circle #137

Sinclair Technologies
ON: 905-727-0165
www.sinctech.com
Circle #138

STI-CO Industries
NY: 716-662-2680
www.sti-co.com
Circle #139

Telsate Telecomunicações
Brazil: +55 11 3965 4544
www.telsate.com.br
Circle #140

WEH Manufacturing the UNtenna Co.
NY: 716-693-6841
www.untenna.com
Circle #141

Wilson Electronics
UT: 435-673-5021
www.wilsonelectronics.com
Circle #142

Winradio Communications
Australia: +61 3 9568 2568
www.winradio.com
Circle #143

PORTABLE RADIO ANTENNAS

MANUFACTURER→	*Antenex*	*Antenex*	*Antenex*	*Antenna Factor*	*Antenna Factor*	*Antenna Factor*	*Centurion Wireless Technologies*	*Centurion Wireless Technologies*	*Centurion Wireless Technologies*	*HyperLink Technologies*
PRODUCT→	**DEXB150BN**	**DEXC450MD**	**DEXRN2400RBTM**	**CW Series**	**PML Series**	**RCS Series**	**SXB/SXD**	**EXC**	**EXH**	**HG2405RD**
↓SPECS										
Suggested list price	$20.66	$16.58	$43.64	$5.74	$5.66	$5.25	$22.55/$17.50	$19.50/$15.60	$22.20/$16.50	$9.95
Frequency range	150-162 MHz	450-470 MHz	2.4 GHz	418/433/869/ 900 MHz	902-928 MHz	902-928 MHz, 2.4 GHz	136-174 MHz/ 400-470 MHz	400-512 MHz	145-174 MHz	2400-2500 MHz
Type/style	--	--	--	Monopole	Centered dipole	Compact helical	Capless sheath, helical radiator	Overmolded whip	Overmolded bottom loaded whip	Rubber duck
Voice or data	Both	Both	Both	Both	Both	Both	Both	Both	Both	--
Construction material	Injected molded	Injected molded	Injected molded	Plastic/metal	Plastic/metal	Plastic/metal	Coil: copper-plated steel, polyurethane sheath	Cable: steel; overmold: polyurethane	Coil: copper-plated steel; cable: steel; overmold: polyurethane	--
Length of antenna	6 in.	6 in.	4 in.	2.91-6.94 in.	5.02 in.	1.77 in.	VHF: 5.5 in.; UHF: 3.5 in.	6.1 in.	9 in. (approx.)	8.2 in.
Fits which manufacturer's radios	Many	Many	Many	Any	Any	Any	All	All, w/connector opt.	All, w/connector opt.	All
Maximum power input	--	--	--	10 W	10 W	1 W	15 W	50 W	50 W	--
Gain	Unity	Unity	Unity	2.2 dBi	2.2 dBi	2.2 dBi	0 dB	0 dB	3 dB	5.5 dBi
Wavelength	1/4-wave	1/4-wave	1/2-wave	1/4-wave	1/2-wave	1/4-wave	1/4-wave	1/4-wave	Helical; 1/4-wave	--
VSWR	1.5:1	1.5:1	1.5:1	<1.9	<1.9	<1.9	2:1 across band	1.5:1 across band	1.5:1 across band	<2
Polarization	Omni	Omni	Omni	Vertical	Vertical	Vertical	Linear/vertical	Linear/vertical	Linear/vertical	Vertical
Nominal impedance	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω
Temperature range	--	--	--	-45° to +80° C	-45° to +80° C	-45° to +80° C	-30° to +65° C	-40° to +85° C	-40° to +85° C	-40° to +85° C
Types of connectors	BNC	MD	Reverse polarity SMA	SMA, RP-SMA	Flylead	SMA, RP-SMA	MX, SFU	HT, KR, MX, MXI, BN, BNX, MD, SF, SFJ, SFU, SM, TN, TNX, SMV, SMI	KR, MX, MXI, BN, MD, SF, SFJ, SFU, SM; TN, SMV, SMI, SFK	RPTNC, RPSMA plugs
Certifications	--	--	--	N/A	N/A	N/A	QS9000, ISO9001:2000	QS9000, ISO9001:2000	QS9000, ISO9001:2000	--
Special features	--	--	Right-angle swivel	--	--	--	Patented sable antenna, durable Tuf Duck	Durable Tuf Duck	Durable Tuf Duck, high-gain VHF antenna	Tilt-and-swivel design

Key: N/A means not applicable. -- means information was not supplied. Dimensions may be rounded off.

Broaden Your

CONNECTIVITY

with PCTEL Antenna Products

Welcome to the world of PCTEL – through innovation and technology we simplify mobile communications by eliminating barriers to the adoption of advanced wireless technologies.

The PCTEL Antenna Products Group produces industry leading antenna brands – MAXRAD®, Antenna Specialists®, and MicroPulse® – which together represent over 90 years of antenna design and development expertise. With over 8000 antenna models in our catalog, you'll be sure to find the ideal antenna design for your wireless application.

The world's leading manufacturers and distributors of radio frequency communication products rely on PCTEL Antenna Products Group for their antenna needs. Contact us today with ***your*** antenna requirements.

antenna specialists

MAXRAD

MICRO PULSE

PCTEL ANTENNA PRODUCTS GROUP, INC.
471 Brighton Drive
Bloomingdale, Illinois 60108-3102
Toll-free within the U.S.: 1-800-323-9122
Phone: 1-630-372-6800
E-mail: antenna.sales@pctel.com
Web: www.antenna.pctel.com

ISO 9001:2000 Registered

Antenna Products Group

PCTEL™
simplifying mobility

See Us at IWCE, Booth 8049 CIRCLE #91

PORTABLE RADIO ANTENNAS

MANUFACTURER→	HyperLink Technologies	HyperLink Technologies	Kendoo Technology	Kendoo Technology	Kendoo Technology	National RF	National RF	National RF	PCTEL - Antenna Products Group
PRODUCT→	HG2403RD	HG2402RD	K-800M	KRA-15/UHF	ATU-5D/VHF	Porta-Quad Type 2-MQ	Type NVF-2 signal locator	Vector finder series	MHWS5800
↓SPECS									
Suggested list price	$7.95	$5.95	$9	$9	$9	$89.95	$139.95	Starting at $239.95	$21.95
Frequency range	2400-2500 MHz	2400-2500 MHz	806 kHz-869 MHz	403-480 MHz	126-174 MHz	135-260 MHz customer specified	220-400 MHz customer specified	130-500 MHz	5.7-5.825 GHz
Type/style	Rubber duck	Rubber duck	LMR rubber antenna	LMR rubber antenna	LMR rubber antenna	Portable VHF cubical quad	Handheld signal locator	Handheld direction-finding antenna	1/2-wave coaxial
Voice or data	--	--	Both	Both	Both	Both	Both	Voice/carrier	Data
Construction material	--	--	PVC coated Ni-alloy	PVC coated Ni-alloy	PVC coated Ni-alloy	Fiberglass and plastic	Fiberglass, plastic, metal	Plastic, metal	Rubber
Length of antenna	5.6 in.	4.7 in.	7 in.	6 in.	6 in.	18 in.	15 in.	N/A	4.5 in.
Fits which manufacturer's radios	All	All	Motorola 800 MHz radios	Kenwood commercial radios	Vertex commercial radios	All, w/connector	All	All FM receivers	Various
Maximum power input	--	--	7 W	7 W	7 W	50 W	Receive only	Receive only	50 W
Gain	3 dBi	2.2 dBi	0 dB, 10-16 dBi	0 dB, 10-16 dBi	0 dB, 10-16 dBi	6 dB (approx.)	3 dB (approx.)	N/A	2 dBi
Wavelength	--	--	1/4-wave	1/4-wave	1/4-wave	N/A	N/A	N/A	1/2-wave
VSWR	<2	<2	1:1.5 ±0.3	1:1.5 ±0.3	1:1.5 ±0.3	<1.5:1	1.5:1	N/A	<1.5:1
Polarization	Vertical	Vertical	--	--	--	Vertical or horizontal	Vertical or horizontal	Vertical	Linear, vertical
Nominal impedance	50 Ω	50 Ω	46-54 Ω	46-54 Ω	46-64 Ω	50 Ω	50 Ω	50 Ω	50 Ω
Temperature range	-40° to +85° C	-40° to +85° C	-15° to +65° C	-15° to +65° C	-15° to +65° C	0° to +40° C	0° to +40° C	0° to +40° C	-40° to +85° C
Types of connectors	RPTNC plug, RPSMA plug, N-male	RPSMA plug	SMA female	SMA female	SMA male	BNC std., customer specified opt.	BNC std., customer specified opt.	BNC std., customer specified opt.	SMA male
Certifications	--	--	ETC	ETC	ETC	Patented design	N/A	N/A	--
Special features	Tilt-and-swivel design	Tilt-and-swivel design	--	--	--	Folds down for transportation	N/A	Antenna elements fold in for transportation	0° to 90° pivot and 180° swivel for vertical orientation regardless of the wireless device's position

MANUFACTURER→	PCTEL - Antenna Products Group	PCTEL - Antenna Products Group	Radiall/Larsen	Radiall/Larsen	Radiall/Larsen	Telsate Telecomunicações	Telsate Telecomunicações	Telsate Telecomunicações	Winradio Communications	Winradio Communications
PRODUCT→	MHWS2400	MHWS902	R380.500.314	SPEN14832	SPWB21150	WU-010 Series	HV-010 Series	ACEL-010 Series	AX-06B	AX-07B
↓SPECS										
Suggested list price	$21.95	$21.95	$30	$46	$39	--	--	--	$24.95	$24.95
Frequency range	2.4-2.483 GHz	902-928 MHz	2.5 GHz/ 4.9-5.9 GHz	806-866 MHz	136-174 MHz	380-470 MHz	136-174 MHz	800-960 MHz	20 MHz-1 GHz	100-900 MHz
Type/style	1/2-wave coaxial	1/2-wave coaxial	PCB	End-fed; 1/2-wave	Helical std.; 1/4-wave	Whip	Helical	Whip	Telescopic	Flexible rubber coated
Voice or data	Data	Data	Data	Both	Voice	Both	Both	Both	--	--
Construction material	Rubber	Rubber	PC, ABS	Polyurethane	TPE Elastollan 1185A/1174D	Flexible steel cable style, injection molded	Helical style design, injection molded stubby	Flexible steel, w/injection molded	Plated steel	Rubber coated
Length of antenna	4.5 in.	10 in.	Bent: 6.1 in.; straight: 7.15 in.	6 in.	6.75 in.	7 in.	4 in.	8 in.	6-23 in.	6.3 in.
Fits which manufacturer's radios	Various	Various	--	Ericsson	Motorola, Kenwood, EFJohnson	Kenwood, Icom, Motorola, Maxon, EFJohnson, etc.	Kenwood, Icom, Motorola, Maxon, EFJohnson, etc.	Kenwood, Icom, Motorola, Maxon, EFJohnson, etc.	Any w/BNC connector	Any w/BNC connector
Maximum power input	50 W	50 W	--	--	4 W	20 W	20 W	20 W	10 W	5 W
Gain	2 dBi	2 dBi	1.6 dBi/5 dBi (max.)	Unity	-4.5 dBi peak (typ.)	Unity	Unity	3 dBi	2.1 dB	2.1 dB
Wavelength	1/2-wave	1/2-wave	--	1/2-wave	1/4-wave	1/4-wave	1/4-wave	1/2-wave	Adjustable length	1/4-wave
VSWR	<1.5:1	<1.5:1	2:1	--	2:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1
Polarization	Linear, vertical	Linear, vertical	Linear vertical	Linear vertical	Linear vertical	Vertical	Vertical	Vertical	Vertical or horizontal	Vertical
Nominal impedance	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω
Temperature range	-40° to +85° C	-40° to +85° C	-36° to +70° C	--	-30° to +70° C	-30° to +60° C	-30° to +60° C	-30° to +60° C	-34° to +38° C	-34° to +38° C
Types of connectors	Male: SMA, TNC; rev. pol. plug: SMA, TNC, BNC; rev. threaded plug: SMA	Reverse polarity: TNC plug, TNC male	RPTNC	M7x1.0, MO-type	SMA FT1 avail. to fit Motorola, Kenwood, and EFJohnson	BNC, TNC, SMA, 1/4-32x7/32	BNC, TNC, SMA, 1/4-32x7/32	BNC, TNC, SMA	BNC	BNC
Certifications	--	--	--	--	--	Anatel	Anatel	Anatel	--	--
Special features	0° to 90° pivot and 180° swivel for vert. orientation regardless of the wireless device's position	0° to 90° pivot and 180° swivel for vert. orientation regardless of the wireless device's position	Dual-band, wideband swivel mount dipole	Specialized end-fed 1/2-wave for EDACS 800/900 MHz radios in a flexible design	Broadband design	The antenna frequency can be tuned as customer orders	The antenna frequency can be tuned as customer orders	The antenna frequency can be tuned as customer orders	Adjustable elbow and adjustable length	Virtually unbreakable

MOBILE RADIO ANTENNAS

MANUFACTURER→	Antenex	Antenex	Antenex	Antenna Plus	Antenna Plus	Antenna Plus	Antenna World	Antenna World	Antenna World	ARC Wireless
PRODUCT→	TRA4503	B4505C	CW4405C	AP8500/18000	AP8500/18000/ GPS	AP8000/GPS-N	CLR-877	PC-1900-7	CLPC-851902X	PSD-155/ PSD-460
↓SPECS										
Suggested list price	$41.08	$39.24	$57.42	$95	$107	$99	$24	$28	$29	$65
Frequency range	450-470 MHz	450-470 MHz	440-470 MHz	824-896/ 1850-1990 MHz	824-896/1850-1990/1575 MHz	806-866/1575 MHz	824-894 MHz	1850-1990 MHz	800-2000 MHz	145-165/ 435-480 MHz
Maximum power input	150 W	200 W	200 W	125 W	5 W	5 W	25 W	25 W	25 W	75 W
Gain	3 dB	5 dB	5 dB	3 dB	3 dB	3 dB	3 dB	5 dB	0-2 dB	Unity
Wavelength	Proprietary	5/8-wave	5/8-wave	12 in., 6 in.	12 in., 6 in.	12 in., 6 in.	Collinear	Dual collinear	1/4-wave	--
VSWR	2:1	1.5:1	2:1 or better	2:1	2:1	2:1	1.4:1 (avg.)	1.4:1 (avg.)	1.4:1 (avg.)	1.5:1
Bandwidth	20 MHz	14 MHz	>10% @ 1.8:1	70 MHz	70 MHz	70 MHz	70 MHz	140 MHz	1200 MHz	20/45 MHz
Mounting	0.75 (std.)	0.75 (std.)	0.75 (std.)	Adhesive	Adhesive	NMO	Magnetic	Magnetic	Magnetic	Adhesive
Radiator material	No whip	Stainless steel	Stainless steel	Brass	Brass	Brass	Stainless steel	Stainless steel	Brass and printed	Mylar
Whip length	No whip	32.75 in.	32.15 in.	N/A	N/A	N/A	12 in.	10 in.	6 in.	N/A
Spring material	N/A	Opt.	Opt.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Load/matching coil construction	Patent whipless design on internal PCB	DC grounded; ABS w/copper, nickel chrome, brass inserts	DC grounded; ABS w/copper, nickel chrome, brass inserts	N/A	N/A	N/A	Open coil	Open coils	N/A	Printed circuit
Types of connectors	Any w/brass mount kit	Any w/brass mount kit	Any w/brass mount kit	All	All	N/A	TNC, mini-UHF, N, SMA, SMB, MCX, MMCX, BNC, RCA, F	TNC, mini-UHF, N, SMA, SMB, MCX, MMCX, BNC, RCA, F	TNC, mini-UHF, N, SMA, SMB, MCX, MMCX, BNC, RCA, F	Mini-UHF, TNC, BNC, FME
Types of cables	Any w/brass mount kit	Any w/brass mount kit	Any w/brass mount kit	RG-58/U	RG-58/U, RG-174/U	N/A	RG-58, RG-58/Ultra	RG-58, RG-58/Ultra, RG-174/Ultra	RG-174/Ultra	RG-58
Other features (not necessarily a complete list)	Black/white; other frequencies available; patent field diversity	Black/chrome; w/ or w/o spring; other frequencies available	Black/chrome; w/ or w/out spring; other frequencies available	Low-profile	Low-profile	Low-profile	Available w/ enclosed single and dual collinear and 900 MHz band	Available on 1710-1850 PCN band	New patent-pending technology; quad-band	Covert, interior installation

MANUFACTURER→	ARC Wireless	Astron Wireless Technologies	Astron Wireless Technologies	Astron Wireless Technologies	Centurion Wireless Technologies	Centurion Wireless Technologies	Centurion Wireless Technologies	Childs Antennas	Childs Antennas	Childs Antennas
PRODUCT→	PSD-850	LoPro NMO 4000	LoPro NMO 8500	NP4892	EXB150	EXC450	EXH150	QS150	3DBS150	5DBS450
↓SPECS										
Suggested list price	$46	$103.50	$103.50	$180	$19.50/$15.60 (depends on connector)	$19.50/$15.60 (depends on connector)	$16.50/$22.20 (depends on connector)	$24	$38	$41
Frequency range	800-900 MHz	450-470 MHz	806-866 MHz	470-490/ 896-960 MHz	150-161 MHz	440-470 MHz	145-155 MHz	118-512 MHz; trim whip tuning	Six models: 138-512 MHz	Four models: 440-512 MHz
Maximum power input	50 W	125 W	125 W	100 W	50 W	50 W	50 W	200 W	200 W	200 W
Gain	Unity	3 dB	3 dB	3 dBi	--	--	--	Unity	3 dB	5 dB
Wavelength	--	N/A	N/A	N/A	VHF	UHF	VHF	1/4-wave	5/8-wave	5/8 collinear
VSWR	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	2.1	<1.5:1	<1.5:1	<1.5:1
Bandwidth	100 MHz	20 MHz	54 MHz	20/40 MHz	11 MHz	30 MHz	20 MHz	18 MHz	12 MHz	10 MHz
Mounting	Adhesive	NMO	NMO	Adhesive	N/A	N/A	N/A	NMO	NMO	NMO
Radiator material	Mylar	N/A	N/A	N/A	N/A	N/A	N/A	17-7 stainless	17-7 stainless	17-7 stainless
Whip length	N/A	N/A	N/A	N/A	5.5 in.	6 in.	9 in.	24 in.	49 in.	31 in.
Spring material	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Electro-polished stainless steel	Electro-polished stainless steel	Electro-polished stainless steel
Load/matching coil construction	Printed circuit	N/A	N/A	N/A	N/A	N/A	N/A	Silver-plated contacts	Encapsulated form wound coil; soldered connections	Encapsulated form wound coil; soldered connections
Types of connectors	Mini-UHF, TNC, BNC, FME	Assorted	Assorted	Assorted	BN, MD, MX, MXI, SF, SFJ, SFU, SMI, TN	BN, MD, MX, MXI, SF, SFJ, SFU, SMI, TN	BN, KR, MD, MX, MXI, SF, SMV, SFK, SFU, SMI, TN	All	All	All
Types of cables	RG-58	N/A	N/A	Assorted	N/A	N/A	N/A	All	All	All
Other features (not necessarily a complete list)	Covert, interior installation	Original low-profile gain mobile antenna	Original low-profile gain mobile antenna	Dual-band low-profile antenna	--	--	--	Heavy-duty shock spring; 5-year warranty	Heavy-duty shock spring; 5-year warranty	Heavy-duty shock spring; 5-year warranty

Key: N/A means not applicable. -- means information was not supplied. Dimensions may be rounded off.

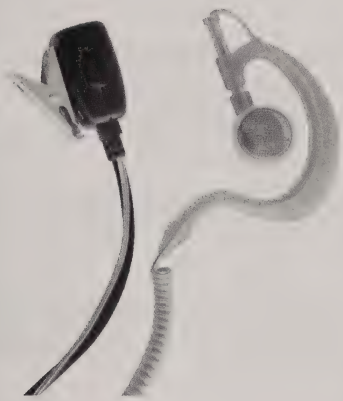
MOBILE RADIO ANTENNAS

MANUFACTURER→	Codan Limited	Comprod Communications	Comprod Communications	Comprod Communications	Comtelco	Comtelco	Comtelco	Hirschmann USA	Hirschmann USA	Hirschmann USA
PRODUCT→	9350 Automatic Tuning Whip Antenna	577-75	583-75	Disguise Antenna AM/FM Look-a-Like	A1641B	A1145A	A1843A	GPS Multi	GPS918 VHF	GPS916
↓SPECS										
Suggested list price	--	$38.50	$28	$100-$300	$33.60	$31.50	$37.80	--	--	--
Frequency range	2-30 MHz	136-174 MHz	406-512 MHz	VHF/UHF/800 MHz, or any combo	406-512 MHz	406-512 MHz	406-512 MHz	VHF, AMPS	VHF, AMPS/PCS	AMPS/PCS
Maximum power input	125 W PEP	125 W	200 W	150 W	200 W	200 W	200 W	10 W	10 W	10 W
Gain	N/A	2 dB	3 dBd	0-3 dBd	Unity	3.5 dB	3 dB	3 dB	Unity	Unity
Wavelength	N/A	1/2-wave	5/8-wave	1/4-wave	1/4-wave	--	5/8-wave	--	--	--
VSWR	Auto-tuned	1.1-2:1	1.5:1	1.1-2:1	<2:1	<1.5:1	<1.5:1	--	--	--
Bandwidth	60 kHz	24 MHz	20 MHz	8-45 MHz	15 MHz	20 MHz	20 MHz	--	--	--
Mounting	Mounting stud	NMO	NMO	Fender mount	NMO/TAD	NMO/TAD	NMO/TAD	Screw, magnet	Screw	Screw
Radiator material	--	Stainless steel	Stainless steel	Steel	Copper alloy	Stainless steel	Stainless steel	Steel, rubber	Steel, rubber	Steel, rubber
Whip length	Stainless steel whip: 47.2 in.; fiberglass whip: 70.9 in.	33 in.	11.5 in.	Depends on the vehicle	None	36 in. (max.)	21 in. (max.)	11.81 in.	12 in.	1.65 in.
Spring material	Stainless steel	--	--	--	N/A	Stainless steel	Stainless steel	N/A	N/A	N/A
Load/matching coil construction	Fully sealed	ABS, spring-loaded contact	ABS, spring-loaded contact	Stub matching	N/A	Silver-plated encapsulated	Wound coil-form O-ring seal	N/A	N/A	N/A
Types of connectors	RF PL259 6-way military-type	NMO	NMO	Versatile	All	All	All	Opt.	Opt.	Opt.
Types of cables	RG-58 antenna feed cable, control cable	Antenna only	Antenna only	Versatile	All	All	All	RG-174	RG-174	RG-174
Other features (not necessarily a complete list)	Fully self-contained, ruggedized, and sealed	Ultrawideband	--	For covert or undercover applications; low VSWR versions available	Low-profile	Spring-loaded contact; gold-plated	Spring-loaded contact	--	--	--

MANUFACTURER→	HorizonAntenna.com	HorizonAntenna.com	HyperLink Technologies	HyperLink Technologies	HyperLink Technologies	Mobile Mark	Mobile Mark	Mobile Mark	New-Tronics Antenna Corp.	New-Tronics Antenna Corp.
PRODUCT→	Non-Line-of-Sight Mobile	Road Warrior 2.4 GHz Minimag Mobile	HG2409MGU	HG2403MGU	RE05U	DM2-2400	CVX-900/1575	IMAG5-2400	LMG	RUM
↓SPECS										
Suggested list price	$29.95	$29.95	$59.95	$34.95	$10.95	$63	$66	$68	$25.50-$27.50	$22.00-$24.22
Frequency range	900-928 MHz	2400-2485 MHz	2.4 GHz	2.4 GHz	2.4 GHz	2400-2485 MHz	900 MHz/ 1575 MHz	2400-2485 MHz	148-174, 450-470 MHz	148-174, 450-470 MHz
Maximum power input	100 W	50 W	100 W	100 W	100 W	10 W	4 W	10 W	200 W	75 W
Gain	7 dB	7 dB	8.5 dBi	3 dBi	5 dBi	2 dBi	1-2 dBi cellular, 5 dBi GPS	5 dBi	3 dB, 5 dB	3 dB, 5 dB
Wavelength	--	--	--	--	--	1/2-wave	1/4-wave	1/2-wave over 1/4	5/8-wave	5/8-wave
VSWR	1.5:1	1.5:1	<2:1 (avg.)	<1:1.5 (max.)	<2:1 (avg.)	2:1 (max.)	2:1 (max.)	2:1 (max.)	1.5:1	1.5:1
Bandwidth	N/A	N/A	100 MHz	100 MHz	100 MHz	85 MHz	70 MHz, 4 MHz	85 MHz	6 MHz, 15 MHz	6 MHz, 10 MHz
Mounting	Thru-hole, trunk, magnetic	Magnetic	N-type magnetic base	Magnetic base	Magnetic base	Surface mount	Covert	Magnet mount	NMO	Magnetic
Radiator material	Stainless steel	Stainless steel	Brass	Brass	Brass	N/A	Flexible	302 stainless steel	17-7PH stainless steel	17-7PH stainless steel
Whip length	20 in.	12 in.	21 in.	3 in. including base	6 in.	No ext. whip	No ext. whip	5 in.	48 in.	49 in.
Spring material	Stainless steel	Stainless steel	Brass	N/A	Brass	N/A	N/A	N/A	Electro-polished stainless steel (opt.)	--
Load/matching coil construction	N/A	N/A	Brass	Brass	Brass	N/A	N/A	N/A	Silver-plated coil and push-pin contacts	Wound coil form, brass contacts
Types of connectors	UHF-male, N-male	N-male/female, RPSMA, RPTNC, MCCARD	All	All	All	Variety	Variety	Variety	Any w/opt. mounts	PL-259, BNC, mini-UHF
Types of cables	RG-58/U N-male connector	RG-58/U	RG58	RG58	RG58	RF-195	RG-174, 2 cables	LMR-240	Opt. mounts 17-ft. RG-58/U	15-ft. RG-58/U
Other features (not necessarily a complete list)	Ref HAMA9-7 or 1PHZHM9-7	Ref HAMA24-7	--	Std. TAD/NMO Motorola type mobile base	5 ft. cable terminated w/connector eliminating pigtail	Also available as a ceiling mount	Also available in triband	Built-in ground plane for wider apps.	High-impact ABS black/chrome w/ or w/o spring	High-impact ABS black/chrome adapter, 8-pole magnet

Precision Audio

designed for professionals
by a dedicated
Accessory manufacturer



Rem Spk Mics - Surveillance Accessories - Headsets - Adaptors

For most Motorola, Kenwood and other popular brands

SABER Accessories NOW AVAILABLE

Replacement microphone cables
to suit original manufacturers' accessories

ODM welcome

Contact Us
Now

ng Deng Industrial Co. Ltd
aipei Hsien, Taiwan
mail: jdi@ms13hinet.net
el: +8862-29822275
ax: +8862-29822324

trademarks are the property of their respective owners

www.jdi-co.com

JDI

CIRCLE #92

MOBILE RADIO ANTENNAS

MANUFACTURER→	New-Tronics Antenna Corp.	PCTEL - Antenna Products Group	PCTEL - Antenna Products Group	PCTEL - Antenna Products Group	Polar Electronic Industries	Polar Electronic Industries	Polar Electronic Industries	Q-Mac Electronics	Radiall/Larsen Antenna Tech.	Radiall/Larsen Antenna Tech.
PRODUCT→	CMT	XtremeWave (B)MEFC24005	Model BMAX824/ 1850 Dual-band PCS/AMPS	BMMG824/1900 Dual-band Magnetic Base	317GC	358C	297	ML-90 Magnetic Loop Roof-Rack Antenna for NVIS	NMOWB450CK	NMOC/P3EUD
↓SPECS										
Suggested list price	$18	--	$32.80	$69.95, $74.95	$35	$31	$17	--	$54	$50
Frequency range	824-896 MHz	2400-2500 MHz	824-896 MHz/ 1850-1990 MHz	824-896 MHz/ 1850-1990 MHz	400-520 MHz	400-520 MHz	108-225 MHz	3.5-15 MHz	450-475 MHz	806-896/1850-1990 MHz
Maximum power input	100 W	50 W	150 W	15 W w/RG-174; 35 W w/ML195	50 W	250 W	50 W	125 W	200 W	10 W
Gain	3.2 dB	5 dBi w/a ground plane; 3.5 dBi w/o	2.2 dBi/4 dBi	2 dBi/6 dBi	4.5 dB	Unity	3 dB	14 dB	3.5 dBd/5.5 dBi	4 dBi ± 0.5 dB @ 860 MHz, 1920 MHz
Wavelength	5/8-wave	--	--	--	5/8- to 1/2-wave	1/4-wave	1/2-wave	20-85 m	--	--
VSWR	1.5:1	<1.5:1	<1.5:1	<1.5:1	1.5:1	1.5:1	1.5:1	3:1	1.5:1 or less	2:1
Bandwidth	100 MHz	100 MHz	72 MHz/140 MHz	72 MHz/140 MHz	20 MHz	10 MHz	4 MHz	40 kHz @ 3.5 MHz; 280 kHz @ 15 MHz	6% @ 1.5 MHz; 11% @ 2 MHz	--
Mounting	Magnetic	Compatible w/ 0.75-in. hole mounts	Mates w/all 1.125-in. 18-thread mounts	Built-in magnetic mount base	Roof rack	On metal ground plane	Roof rack	Vehicle roof rack	NMO	NMO
Radiator material	Stainless steel	0.1-in. OD stainless steel	0.062-in. diameter black stainless steel	0.062-in. diameter stainless steel	17-7PH stainless steel	Cast aluminum	Stainless steel	Aluminum	Copper-plated stainless	Copper
Whip length	11 in.	16 in.	12 in. (approx.)	10.5 in.	36 in.	N/A	45 in.	4.9 x 3.9 ft. roof rack	35.5 in.	3.86 in.
Spring material	--	N/A	N/A	N/A	Stainless steel	N/A	N/A	N/A	Chrome	N/A
Load/matching coil construction	Stainless steel open-coil design	--	Molded polymer w/ brass insert ring and spring-loaded brass contact pin	Molded acrylonitrile butadiene styrene	Chrome-plated brass	Cast aluminum	ABS plastic	Includes automatic antenna tuner	Copper	N/A
Types of connectors	TNC, mini-UHF	Mount w/attached cable and connector (sold separately)	Mount w/attached cable and connector (sold separately)	Male SMA, N-female, reverse polarity TNC, SMB plug	User-fitted	N-female	User-fitted	50 Ω BNC	PL259, MPL, TNC, BNC, N	FME (universal), MPL, SMA, TNC, NOCONN
Types of cables	12-ft. RG-58/U	Mount w/attached cable and connector (sold separately)	Mount w/attached cable and connector (sold separately)	6-ft. RG-174 or 12-ft. ML195 options	RG-58	N/A	RG-58	50 Ω coax	RG-58A/U, RG-58/U dual-shield	RG-58/U dual-shield
Other features (not necessarily a complete list)	High-impact ABS black, black polyester powder coating	Feed point is 9.25 in. above mounting surface, clearing overhead light bars	Antenna is ready to install; no rod cutting is required	Low-profile design	High-capture area, ground independent mobile antenna	Rugged, low-profile skate antenna; 2.5-in. high	Ground independent, lightweight mobile antenna	No skip zone; high gain/Q; designed for NVIS propagation	--	--

MANUFACTURER→	Radiall/Larsen Antenna Tech.	Sinclair Technologies	Sinclair Technologies	Sinclair Technologies	STI-CO Industries	STI-CO Industries	STI-CO Industries	Telsate Telecomunicações	Telsate Telecomunicações	Telsate Telecomunicações
PRODUCT→	LPT2400NMOHF	SM1482	ST221	SM500	Covert, Fender-mount Antenna	Tactical, Interoperable Antenna Sys.	Public Safety Flexi-Whip Antenna	MTA 443	OA6	ATF 104
↓SPECS										
Suggested list price	$41	$50	$218	$56	$210	$750	$50	$280	$100	$60
Frequency range	2400-2500 MHz	132-174 MHz	138-174 MHz	806-1800 MHz	27-896 MHz	106-1550 MHz	136 MHz-1 GHz	148-174 MHz	800-960 MHz	136-174 MHz
Maximum power input	10 W	100 W	300 W	50 W	150 W	150 W	150 W	300 W	100 W	100 W
Gain	1 dBi ±0.5 dB @ 0° elevation; 5 dBi ±0.5 dB @ 35°; 1 dBi ±0.5 dB w/o ground plane	2 dBd	Unity	--	Unity	Unity	Unity	Unity	3 dBi	6 dBi
Wavelength	--	--	--	--	Varies	Varies	1/4-wave	--	5/8-wave	--
VSWR	2:1	2:1	1.5:1	1.5:1	<2:1	<2:1	<2:1	1.5:1	<2:1	<2:1
Bandwidth	--	26 MHz	25 MHz	5 models: 806-960, 1350-1400, 1750-1800 MHz	Varies w/frequency range	1444 MHz	Varies w/frequency range	10 MHz	30 MHz	30 MHz
Mounting	NMO	1 1/8-18 (TAD/TAE)	Mounting hardware supplied	Mounting hardware supplied	OEM mount	Mounting options available	NMO, trunk lip, magnet mounts	4 screws	0.75-in. hole mount	0.75-in. hole mount
Radiator material	PCB	17-7PH stainless steel	Cast aluminum	Copper	Stainless	Aluminum	Nitinol	Aluminum	Stainless steel, aluminum	Stainless steel
Whip length	3.5 in. (overall)	42.5 in. (max.)	N/A	N/A	31 in. (approx.)	35.5 in. (approx.)	Cut to frequency; cutting chart provided	12.6 in.	12.4 in.	38 in.
Spring material	N/A	Stainless steel	N/A	N/A	N/A	N/A	N/A	Copper	Copper	Copper
Load/matching coil construction	N/A	ABS plastic, stainless steel	N/A	N/A	Stub-matching network	Tri-band coupler	N/A	--	High-Q coil, waterproof	High-Q coil, waterproof
Types of connectors	FME (universal), N, SMA, TNC, NOCONN	N/A	N-female or UHF-female RG-58	N-female	PL259, mini-UHF, BNC, TNC, SMA, N	PL259, mini-UHF, SMA, BNC, TNC, N	PL259, mini-UHF, BNC, TNC, SMA, N	UHF-female	UHF-female	UHF-female
Types of cables	RG-58/U dual-shield	RG-58	--	N/A	17-ft. RG-58/U	50-ft. low-loss cable	17-ft. RG-58/U	--	--	--
Other features (not necessarily a complete list)	--	--	--	--	Single or dual-band HF, VHF, UHF, or CEL avail.	Works w/interconnect trans. syst. away from est. facilities	Flexible mast will bend but will not break	Low-profile	--	--

Continued on page 129

NEW PRODUCTS

Ethernet Platform

DragonWave, a supplier of next-generation wireless networks, unveiled the AirPair 200 wireless Ethernet platform. With 200 Mbps full-duplex transport, the platform provides in-service Ethernet and TDM that can be upgraded from 10 Mbps to 200 Mbps committed full-duplex data rates. It offers users connectivity to next-generation Ethernet through a native Gigabit Ethernet interface and supports native IP transport, ultra-low latency, and multiple protection options, (including mesh restoration). ***Circle #144***

Modular Microwave Radios

Adtran offers the Tracer 6000 modular microwave radios, which combine TDM and IP functionality in a single 1U chassis. Users can combine a variety of plug-in modules to meet TDM, IP, and mixed-mode service requirements. The series is available in both integrated and split-system configurations. The radios operate in the 5.8 GHz ISM band for point-to-point connectivity, with user-adjustable bandwidth up to 16 Mbps full-duplex at distances up to 30 miles. ***Circle #145***

Multimodular PDA

DAP Technologies introduced the Microflex CE3240 multimodular PDA. Designed for the mobile workforce, it is

equipped with an Intel XScale PXA 255 400 MHz processor and runs on the Windows CE 5.0 operating system. Supporting optional two-dimensional scanning, the PDA also offers GPRS, CDMA 1X RTT WWAN, and 802.11b WLAN wireless connectivity. It features a 3.5-inch QVGA TFT transflective color LCD display for indoor and outdoor use. ***Circle #146***

Solar-Powered Asset Tracking

GeoLogic Solutions added a solar-powered option to its TrailerMax asset monitoring system. TrailerMax Solar contains all the functionality of the TrailerMax system, but in addition to using power from the tractor to charge the battery, it also utilizes solar power to recharge when the trailer is not tethered to the tractor. TrailerMax is an event-driven, user-configurable asset monitoring system that enables fleet managers to configure exactly when a notification is sent from a trailer. ***Circle #147***

Antenna Speaker Mic

Stone Mountain released the 800 MHz remote antenna speaker configured for the Motorola XTS and HT750/1250 portable radios. The system features a custom-designed cable assembly that includes an

overmolded BNC connector, gold-plated BNC/SMA adapter, and molded rubber environmental sealing grommet. Available in the Sword series speaker mic, the product includes the low-profile integrated ProBand antenna, which utilizes printed circuit flex film technology (PCFFT). ***Circle #148***

Notebook Computer

Getac launched the MobileForce M220 portable notebook computer. Running on Intel's 1.4 GHz Dothan LV processor, the computer complies with military standards and meets today's mobile workforce requirements. Getac reports the product offers a powerful processor, low-power consumption, and a lightweight design. In addition, the M220 features a versatile Bay 1 and removable HDD bay design. Bay 1 can accommodate an optical drive or a second battery. ***Circle #149***

Mobile Base Station

Innovative Circuit Technology (ICT) developed a mobile radio base station, which can be individually customized to fit

See Us at IWCE CIRCLE #93

NEW PRODUCTS

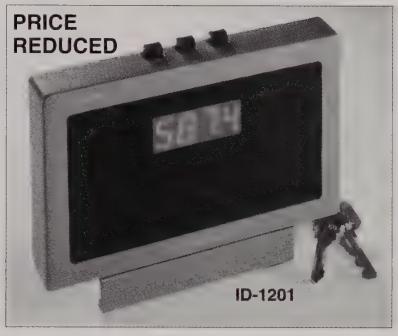
various radio models. The unit may be purchased separately or as a complete base station (power supply assembled with cover). The newest editions of the base station series are designed for the Kenwood TK7180 and TK8180 radios. ***Circle #150***

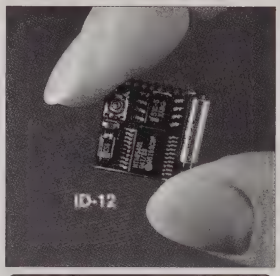
Data Transceiver

The Communicator II wireless data transceiver from **Intuicom** is designed for industrial serial and serial-to-IP networks. Utilizing frequency-hopping, spread-spectrum technology, the transceiver enables long-range (60 miles line of sight) wireless connectivity at bandwidths up to 115 kbps. Available in 902-928 MHz and 2.4-2.4835 GHz frequencies, the product offers license-free operation. It can act as a base, remote, or remote/ repeater in point-to-point, point-to-multipoint communications, and IP-bridged network applications. ***Circle #151***

Digital ANI MDC-1200® Signaling

PRICE REDUCED





CSC | CONTROL SIGNAL

www.ControlSignal.com

Control Signal's ID-12/1201 is an economical **MDC-1200** ANI system. The ID-12 encoder works in all radios and fits in virtually all handhelds and mobiles. The ID-1201 decodes any **MDC-1200** ANI signal, has a large LED display, a printer port and an RS232 port.

– NEW LOWER PRICES —

MDC-1200 is a registered trademark of Motorola Inc.

800-521-2203 • 303-989-8000 • Fax 303-989-8003 • www.ControlSignal.com

CIRCLE #94

atis Ltd.

A Different Voice Logging Solution

Effective risk management begins by knowing exactly what was said, by whom, and when. Protect the security of your organization with a multi-channel, professional recording system by ATIS, Ltd.

Emergency Services
Call Centers
Air Traffic Control
Utilities

- 8-128 Channel Digital Recording Systems
- Air Traffic Control Announcers
- Instant Recall Recorders
- Radar Recording
- All-inclusive Design

- Network Ready Systems
- Ruggedization Options
- Military Applications
- Lawful Interception
- No matter what the application...

Legal
Financial Institutions
Transportation
Military

Visit ATIS, Ltd. today at www.atisdigital.com 770.664.4744

CIRCLE #95

Locator Device

Trimble presents a new version of its TrimTrac locator. Redesigned in a water-resistant housing, the locator's expanded feature set includes on-demand polling, motion-based or scheduled reporting, and other enhanced query functions. It is a complete end-user device that allows location-based service providers and system integrators to provide automatic position reporting for personal vehicle monitoring. The device can also support select roadside assistance and concierge services with application server and call center capabilities supplied by third-party service providers. ***Circle #152***

Handheld Spectrum Analyzer

Anritsu's MS2721A handheld spectrum analyzer conducts analysis on 802.11a, 3G, ultrawideband, and WiMAX signals. Weighing 6.4 pounds, it has a measurement capability for applications up to 7 GHz. Engineers and field technicians can use the unit to design, deploy, and optimize the performance of wireless devices and networks for commercial and public safety applications. The analyzers cover the 100 kHz to 7.1 GHz frequency range. With a single button, users can make several measurements including field strength, channel power, occupied bandwidth, adjacent-channel power ratio (ACPR), and carrier-to-interference ratio (C/I). ***Circle #153***

Lightning Protectors

The GX Series lightning protectors from **PolyPhaser** provide multi-strike lighting protection for sensitive tower-mounted amplifiers (TMAs), tower-top amplifiers (TTAs), and active antenna systems where DC voltage is required. With fully weatherized housing and low throughput energy, the protectors are available in DC-Pass or Bias-T versions, along with N or 7/16 standard connectors. The protectors offer a return loss of more than 20 dB and cover the 400-2500 MHz frequency range (CGX: 400-1200 MHz; DGX: 800-2500 MHz). Insertion loss is 0.1 dB maximum. ***Circle #154***

Adapter Kits for Wi-Fi

RF Connectors, a division of RF Industries, released two Unidapt universal adapter kits, designed for technicians who work with Wi-Fi and broadband systems.

Both the RFA-4018-WIFI and RFA-4028-WIFI kits contain an assortment of 30 universal adapters that include both male and female connector interfaces. By joining two adapters with a universal center, coaxial adapters can be made with any combination of interfaces. The kit adapters feature Teflon insulation, silver-plated machined brass bodies, and gold-plated contacts. Both kits contain a universal coaxial cable tester that accepts any Unidapt adapter to test mating cable assemblies. ***Circle #155***

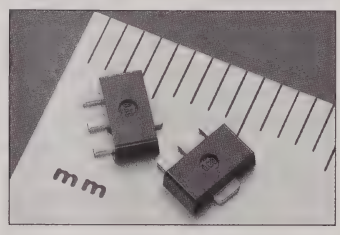
Magnetic-Loop Roof-Rack Antenna

Q-Mac Electronics designed the ML-90 magnetic-loop roof-rack antenna for near vertical incidence skywave (NVIS) operations on HF frequencies. The company says skip zones are substantially

eliminated and coverage — with the correct selection of frequency — is up to 621 miles. The ML-90 automatic tuner unit uses a continuously variable tuning capacitor, driven by a microprocessor-controlled stepper motor, to accurately peak the antenna current. ***Circle #156***

Transistor Amplifiers

California Eastern Laboratories (CEL) announced the availability of two medium-power SiGe HBT transistor amplifiers from **NEC**. The 800-milliwatt NESG250134 and



1-watt NESG260234 are designed for two-way radio applications. CEL says the devices deliver high gain with high collector efficiency, which helps reduce DC power consumption in handheld battery-powered products. ***Circle #157***

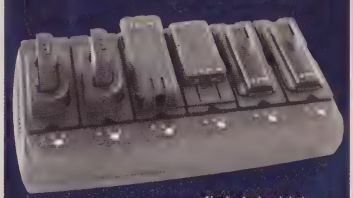
LITERATURE

Artech published the following new titles: "Technology Trends in Wireless Communication" by Ramjee Prasad and Marina Ruggieri; "Location Management and Routing in Mobile Wireless Networks" by Amitava Mukherjee, Somprakash Bandyopadhyay, and Debashis Saha; "The Future of Wireless Communications" by William Webb; "Practical Wireless Data Modem Design" by Jonathon Cheah; "Mobile Satellite Communications" by Shingo Ohmori, Hiromitsu Wakana, and Seiichiro Kawase; and "Wireless Communications for Intelligent Transportation Systems" by Scott D. Elliott and Daniel J. Dailey. ***Circle #176***

ISO 9001

World-class battery analyzers & chargers designed with the future in mind

Two and four-station C7000 Series battery analyzers



Single, dual and six-bay Universal Conditioning Chargers

Batteries have become the lifeline in our society. Cadex Electronics recognizes their importance and provides products to enhance performance and increase longevity.

CADEX

Cadex Electronics Inc.
www.cadex.com
Tel: 604 231-7777 800 565-5228
Fax: 604 231-7755 info@cadex.com

See Us at IWCE CIRCLE #96

NEW PUBLIC SAFETY PRODUCTS

Mobile Radio with LCD Display

Tait Electronics launched the TM8250 analog mobile radio featuring a large

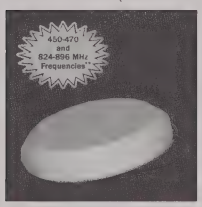
alphanumeric LCD display and a comprehensive easy-to-use menu structure. It offers 1,500 conventional channels and is suitable for mobile teams such as emergency services and transport fleets. Optional features include a keypad microphone, which can be used to select channels and make calls, and a remote control head, which allows the radio control head to be mounted up to 20 feet away from the radio body. ***Circle #158***

Manpack Radio

Codan Limited released the 2110 SSB manpack radio, a lightweight, rugged, and waterproof solution for long-range communications while on foot. With a large and clear backlit display and keypad, users can access the radio's most immediate functions via a single-key press. The product complies with Fed-Std-1045 and Mil-Std-188-141B automatic link establishment (ALE) standards. It also features the company's advanced ALE technology, CALM. ***Circle #159***

Dual-Band Antenna

Astron Wireless Technologies introduced the dual-band (450-470/824-896 MHz)



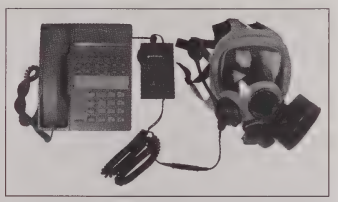
low-profile antenna for public safety applications. Compact in size, it measures 7.5 inches in diameter and 1.4 inches in height. The antenna is packaged with a single cable lead and adhesive mount. Many connector styles are available. ***Circle #160***

Fingerprint Identity Products

Motorola offers improved processes to identity fingerprint and palmprint images in its Printrak LiveScan product lines for public safety agencies. Features include FBI Appendix F-certified software and portable scanner, three-part full palm capture, and instant live video of the fingerprint and palmprint images feedback. The product lines support sequence checking for both fingerprints and palmprints and touchscreen operation with industrial commercial-off-the-shelf (COTS) display. ***Circle #161***

Communications System

Audiopack Technologies unveiled the PhoneCom system designed for 9-1-1, command-and-control, and mobile command center personnel. The company says



the product enables clear two-way communication between mask and phone system during nuclear, biological, chemical, or hazmat incidents. PhoneCom consists of a mask-mounted interface unit and an optional telephone interface box that allows users to interface directly with their phone system. It picks up the voice signal outside the mask using the company's audio filter technology. In addition, the incoming phone message is delivered to the ear without interfering with a protective hood or overgarment. ***Circle #162***

In-Building Wireless Broadband System

InnerWireless' in-building wireless broadband distribution system supports a wide range of wireless applications and services in large commercial buildings. The company says the system provides uniform wireless coverage in buildings ranging up to 10 million square feet in size. It supports interpersonal communications such as PCS/cellular, messaging/personal data, enterprise voice, and paging. The system enables operations such as Wi-Fi, RFID, and specialized applications for venue-specific requirements. It also accommodates building operations including building automation, security and first responder communications, and push-to-talk radios. ***Circle #163***

Emergency Signs

OnScreen Technologies' RediAlert R.D.E.S. (rapid dispatch emergency signs) deliver rapid-response text and graphics to

support the information needs of the Department of Homeland Security, public safety agencies, and public works departments. It can be deployed in less than 5 minutes to communicate critical information and urge caution in dangerous situations. The product operates on a 12-volt power source. Self-contained power features include solar panels, battery packs, and an adapter that fits into a vehicle's cigarette lighter. ***Circle #164***

Software Upgrade

Avtec, manufacturer of the DSPatch console system, announced a software upgrade for use with **Cimarron Technologies**' multichannel controller. The software integrates both hardware products and supports encoding and decoding of MDC-1200, GE-Star, DTMF, and FleetSync automatic numeric identification (ANI) over two-way radio systems. The software, which installs as a field upgrade, also supports aliasing of unit IDs. The unit IDs are composed of two eight-character name fields which reside in the DSPatch system database. Up to 4,000 unit-IDs are supported. ***Circle #165***

Portable Command Post Control Station

The **Panther Electronics** Fire C.A.T. (2001-CP) portable command control station features Icom 521/621 mobile radios with 50-watt power output and 256-channel capacity. It can handle "dead" communication areas inside high-rise buildings, tunnels, and other difficult locations, according to the company. The system is useful in providing manual relay

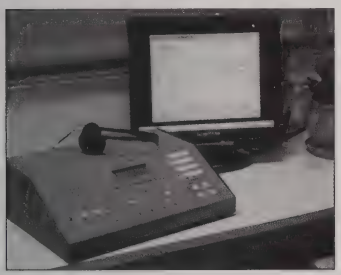
position for an incident commander and firefighters in a building that an 800 MHz trunking system cannot penetrate. In this scenario, the incident commander finds a location where he can establish two-way communications with the dispatcher on a trunking portable, and he can manually relay communications from the firefighters via the Fire C.A.T. system to the dispatcher. ***Circle #166***

Mobile Data Software

Spillman Technologies states that the new Mobile 4.0 software enhances field operations by providing streamlined searching capabilities, a valuable message center, and a redesigned user interface. Features include instant chat, state and national queries, a mobile message center, automatic alert notifications, and customizable viewing options. ***Circle #167***

Simulation Training Package

Professional Pride expanded its Simulation Training Package. Two new manuals,



"The Dispatchers Firing Range" and "50 9-1-1 Simulation Scripts" educate trainees on how to get floor ready. The two books, along with EZ CADsoftware, create seamless integration of step-one call-taking training. ***Circle #168***

Satellite PTT Handsket

Mobile Satellite Ventures (MSV), a provider of satellite communications, announced a push-to-talk (PTT) handset and a new rate plan program for the public safety/first responder market. MSV's handset is compatible with its existing customer equipment, allowing public safety users to expand their user base and continue to integrate satellite into their overall emergency management operations, thus enabling real-time communications anywhere in North America, according to MSV. The new annualized rate plan for dispatch radio service includes an allocation of voice minutes. The plan translates into fixed annual service costs and a bonus allocation of voice minutes to provide users the flexibility of making private telephone calls over a secure network as the need arises. ***Circle #169***

Public Safety Software

VisionAIR, a developer of public safety and criminal justice software offers VisionFire 3.4, which features new functionality in the training and site modules, improved reporting capabilities, and a new appearance. Additional features include an NFPA 1710 response time report and NFIRS 5.0 specification changes. With the new software, agencies can automatically download updates and maintenance releases via VisionAIR's online client service center. ***Circle #170***

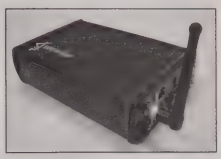
VHF Transceiver

Q-MAC Electronics' lowband (30-88 MHz) VHF-90M transceiver offers integral legacy mode for interoperability with in-service PRC-77 radios, optional encrypted frequency hopping (100 hops per second), and fixed encryption. It is

suitable for man-portable (holster/vest) applications and vehicle/base station applications, via an amplifier applique unit. The product offers backward and forward compatibility and complies with Mil-Std-810F for immersion, shock, vibration, dust, and temperature rating specifications. ***Circle #171***

Wireless Mesh Router

Sensoria Corp. launched the EnRoute400 wireless mesh router, a commercial off-the-shelf (COTS) device for mesh communications that provides "wireless broadband to go" for emergency response, homeland security, and military



applications. The router is based on the company's Wireless-Fabric mesh communications software, a radio-independent wireless networking software suite that enables each EnRoute400 to route and repeat network traffic, creating a wireless virtual private network for peer-to-peer and peer-to-many communications. ***Circle #172***

Software Radio Technology

TechnoConcepts recently developed True Software Radio (TSR) technology that converts radio frequency signals directly into high-speed data streams, which are then sorted and demodulated with digital signal processing. The capability allows for the design of communication devices that utilize radio frequency waves (e.g., cell phones, wireless modems, and radio systems) and that can be reconfigured to receive at any frequency and translate any protocol via software programming. ***Circle #173***

Speaker/Mic with LED Illumination

OTTO Communications released the Lightsword speaker/microphone with a dual LED lighting feature. It integrates two 4600-millicandela LEDs into the front cover of an Evolution speaker/mic, providing hands-free illumination of the immediate area with the flip of a switch. The product also works as a mini flashlight when

removed from the lapel. Lightsword was developed as a backup and auxiliary light source for law enforcement, but also can be used in firefighting, military, and industrial applications. LED lighting is controlled with an off/on control knob on the front of the speaker mic. One hour of "lights on" is equal to approximately one minute of transmit time. ***Circle #174***

9-1-1 POLICE • MEDICAL • FIRE EMERGENCY NENA

NATIONAL EMERGENCY NUMBER ASSOCIATION

ANNUAL CONFERENCE & TRADE SHOW

long beach

Long Beach, CA
June 25-30, 2005

REGISTER BY MAY 27 AND
SAVE $175
www.nena.org
1-800-332-3911

HOT TOPICS

NG-E9-1-1: WHAT IT MEANS FOR YOU

GET READY FOR THE COMING VoIP REVOLUTION

SOLVING YOUR STAFFING PROBLEMS

THE INTELLIGENT 9-1-1 CENTER OF THE FUTURE

WHAT YOU NEED TO KNOW ABOUT PSAPs, LAW AND PUBLIC POLICY

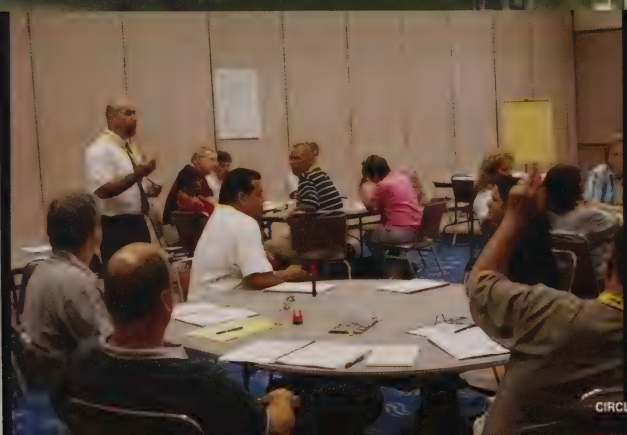
PLUS!

NETWORK WITH INDUSTRY LEADERS

SEE THE LATEST IN TECHNOLOGY AND SERVICES IN OUR GIANT EXHIBIT HALL

SEE OLD FRIENDS AND MAKE NEW ONES AT NENA'S LEGENDARY OPENING RECEPTION

DISCOVER THE MANY ATTRACTIONS OF LONG BEACH AND SOUTHERN CALIFORNIA



CIRCLE #97

Continued from page 122

MANUFACTURER→	WEH Mfg.	WEH Mfg.	WEH Mfg.	Wilson Electronics	Wilson Electronics	Wilson Electronics	Winradio Comms.	Winradio Comms.	Winradio Comms.
PRODUCT→	CR2A	CR4A	CR109ARD	Trucker Cellular Antenna	Magnet-Mount Cellular Antenna	R/V Trucker Roof Mount	AX-31B	AX-37A	AX-07B
↓SPECS									
Suggested list price	$74	$62	$128	$59.95	$31.95	$84.95	$129.95	$395	$29
Frequency range	115-170 MHz	400-500 MHz	30-85 MHz	806-894 MHz/ 1850-1990 MHz	806-894 MHz/ 1850-1990 MHz	806-894/ 1850-1990 MHz	230-1600 MHz	400-3000 MHz	100-900 MHz
Maximum power input	--	--	--	50 W	50 W	50 W	N/A (receive only)	N/A (receive only)	SW
Gain	Unity	Unity	Unity	5.12 dB/6.12 dB	5.12 dB/6.12 dB	5.12 dB/6.12 dB	26 dB	26 dB	2 dB
Wavelength	1/4-wave	1/4-wave	1/4-wave	0.9/1.95	0.9/2.0	0.9/1.95	--	--	--
VSWR	1.5:1	1.5:1	1.5:1	<2:1	<2:1	<2:1	1.7:1	1.4:1	1.5:1
Bandwidth	2.75% of design	2.75% of design	2.75% of design	100 MHz/150 MHz	100 MHz/150 MHz	100 MHz/150 MHz	--	--	--
Mounting	NMO	NMO	NMO	Standard CB 0.375-in. x 24 tread	Magnet	Universal roof mount (included)	Mast or adhesive	Mast, handheld, adhesive	Magnet mount direct or on to TX
Radiator material	Stainless steel	Stainless steel	Stainless steel, aluminum	Stainless steel	Stainless steel	Stainless steel	Fiberglass	Fiberglass	Nylon
Whip length	Non-whip: 1.75 in.	Non-whip: 1.75 in.	Non-whip: 6 in.	32.625 in.	12.25 in.	18 in.	N/A	N/A	6.3 in.
Spring material	N/A	N/A	N/A	N/A	N/A	Hardened steel	N/A	N/A	N/A
Load/matching coil construction	N/A	N/A	N/A	Stainless steel	Stainless steel	Stainless steel	--	--	--
Types of connectors	NMO	NMO	NMO	FME-female	FME-female	FME-female	SMA	SMA	BNC
Types of cables	--	--	--	RG-58	RG-174	RG-58	--	--	--
Other features (not necessarily a complete list)	Undercarriage mountable	Undercarriage mountable	--	Mirror mount	--	Roof mount w/built-in spring	Recommended for indoor, protected point-to-point apps.	Optional weather-proof case	--

Reach 34,000+ readers.

ACTION CLASSIFIEDS

1-800-548-5536

We accept VISA, Mastercard and Am Ex.

Call Terry: 800-548-5536 Ext. 13,
fax: (303) 792-2391, or
e-mail: tbelair@radioresourcemag.com

Terry Belair
Classified Advertising Mgr.

	Page
Business For Sale	131
Dealer Opportunities	132
Equipment For Sale	133 - 149
Help Wanted	130
Labels	129
Licensing	130
Looking To Buy	133
Marketing Services	129
Software	130
PUBLIC SAFETY PRODUCTS & SERVICES (Engineering Consultants, Equipment For Sale)	148 - 149
Rentals	130
Repairs	131
Shelters and Enclosures SPECIAL FEATURE	150
Tower Sites/Site Products and Services	150
The Directory of Professional Services	151

MARKETING SERVICES

The 2nd Annual
Land Mobile Dealer
MARKETING SUMMIT 2005
Monday April 4th and Tuesday April 5th
Bellagio Hotel - Las Vegas
www.dealermarketingsummit.com

SEE US AT IWCE

STAND OUT
ADD COLOR!!

LABELS

LABEL graphics

pager labels
cellular labels
2-way radio labels
computer labels
dome labels
void material
and much more

- fast service
- small quantities
- full art dept.
- free samples

800.652.2351 fax 561.790.7721

11298 Roselynn Way, Lake Worth, FL 33467
labelgraphicsinc.com

CIRCLE #200

TWO-WAY RADIO LABELS

- ✓ Fast Service
- ✓ Free Samples
- ✓ On Time Delivery
- ✓ Higher Quality Custom Made Materials
- ✓ Global Customer Base
- ✓ Exceptional Customer Service

- Customized labels to enhance your company's image.
- Tamper-Proof & Warranty Labels.
- ESN Labels & Printing Systems.

World Class Service for Worldwide Customers!

Advanced LABELING SOLUTIONS
Call OGGIE or RAYNA
866-212-5223 • 903-482-0707
www.printsolutions.us Fax (903) 482-5886 se habla español

SEE US AT IWCE CIRCLE #201

CLASSIFIEDS

LICENSING

Cara Enterprises
DOUG THOMPSON
FCC Licensing, Part 90 and Part 101
PO Box 17503
Salt Lake City, UT 84117-0503
(801) 278-9728 Fax: (801) 278-7239

CIRCLE #202

EagleWave Electronics Inc.
FCC License Preparation Services
www.eaglewave.com
P.O. Box 80123 Dartmouth, MA 02748-0123
1-888-317-9141 Fax: 1-888-298-2762

RADIO LICENSES FOR SALE

220 MHz phase I and II licenses for sale in:

- North/Central California
- Dallas/Houston
- Chicago/Milwaukee
- New York

900 MHz licenses and MTAs for sale in:

- Orlando/Tampa

Most licenses available with/without subscribers and infrastructure.

Send inquiries to:
Amanda@fleetwirelesssolutions.com
800/422-4535 ext. 110

SOFTWARE

cri computer resources inc.
Two-Way Integrated Software
Recurring Billing
Service Management
Inventory/Purchasing
Sales/Rentals/Commissions
Order Entry/Quotes
Job Tickets & Accounting
Air Time Billing
FREE 30 Day Demo
(800) 741-8110
www.crinc.com

SEE US AT IWCE CIRCLE #203

HELP WANTED

Wireless Technicians Needed

CEI is a financially strong, leading wireless communications company located in California's Central Valley. We are recruiting for two Wireless Technician positions.

The position requires FCC radio/telephone operator's license or equivalent. Military or Vocational-technical school with three years experience can be substituted for FCC license. FCC license or equivalent must be obtained within one year. Must have working knowledge and be able to perform component level repairs in some or all of the following areas: LTR Trunking; EDACS; VHF; UHF and 800 Systems; Consoles; SCADA; Data Telemetry; Spread Spectrum; Licensed/Unlicensed Microwave; and Wireless LAN/WAN.

The right candidates will receive a competitive salary, health and dental and a company matching IRA plan.

Visit us at www.cei-wireless.com. Respond to jobs@cei-wireless.com

Telecommunications Specialist II

City of Gainesville, Florida/Gainesville Regional Utilities
$22.16 - $27.37 Hourly
For minimum qualifications, see our website
Preferred: Experience with digital trunked radio systems
Apply online at **www.cityofgainesville.org**
DFWP/AA/EEO/Vet Pref.

RENTALS

CIRCLE #204

CIRCLE #205

CIRCLE #206

ACTION CLASSIFIEDS
1-800-548-5536
Contact Terry today! Ext. 13
tbelair@radioresourcemag.com

REPAIRS

SERVICE MONITOR REPAIR & CALIBRATION

CARDINAL ELECTRONICS, INC.

Exclusive Monitor repair since 1973 • NIST TRACEABLE • NEW LOWER RATES

IFR, Motorola, Cushman, Wavetek

1631 N. Evergreen Ave. Arlington Heights, IL 60004

Phone: 847.797.7820 Fax: 847.870.0342 www.cardinalelec.com

CIRCLE #207

Cushman/IFR/Motorola/Wavetek

- Get Your Test Equipment Needs From Service Professional
- We Buy and Sell Service Monitors
- Communication Service Monitor Repair & Calibration Specialists

NS Electronics Service, Inc.
3610 Dekalb Technology Pkwy.,
Ste 110/111
Atlanta, GA 30340
Telephone: 770-451-3264
Fax: 770-458-8785
www.nselectronics.com

Minitor II & III Pager Repair

- $45 per pager plus parts
- 10 day turn around
- Genuine Motorola Parts
- Authorized Motorola Distributor

MINITOR III

UNITED COMMUNICATIONS CORP.

18 years in business. *"Large enough to serve you...small enough to know you."*

888-763-7550 MOTOROLA Authorized Paging Distributor www.uccwireless.com

SEE US AT IWCE CIRCLE #208

FRMC Certified!

BEARCOM
Wireless Worldwide
Sales, Rentals & Service

72 Hour Turnaround!

Two-Way Radio Repair!

4009 Distribution Dr Ste 200
Garland, Texas 75041

MOTOROLA Authorized Two-Way Radio Dealer ICOM

Phone: (800) 458-9887 • Fax: (214) 355-1727

CIRCLE #209

QUALITY RADIO REPAIRS

LOW FLAT RATE REPAIRS ON:
MOTOROLA, KENWOOD, MAXON, VERTEX, JOHNSON, UNIDEN, AND MORE!

Fifteen years of great service to you!

MOSS COMMUNICATIONS

www.mosscom.com
800-822-MOSS

CIRCLE #210

$49 Flat rate plus parts

MOTOROLA PORTABLE & MOBILE REPAIR

★ 90-Day Warranty
★ FCC Licensed Techs
★ Fast Turn Around

Portable Radio Service, LLC
209 Kera Drive
Mountain View, AR 72560
870-269-5666
www.portable-radio-service.com

CIRCLE #211

ADVANTAGE COMMUNICATIONS

SALES ▼ SERVICE ▼ RENTALS

MIDLAND maxon UNIDEN MOTOROLA KENWOOD ICOM

1300 NW HWY 24
TOPEKA, KS 66608

FLAT RATE REPAIR!! $49.95

1-800-721-9631

CIRCLE #212

BUSINESS FOR SALE

BUSINESS FOR SALE

Communications business in Colorado

- Full line Motorola and Radius dealer with service shop.
- Satellite phones.
- (3) 800 MHz Privacy Plus Trunking Systems.

Call: 1-888-268-1249
email: ts@gwe.net

Motorola- Minitor® 2

REPAIRS $52.50

Price includes all parts and labor*
Dealer Price Only.

One Week Turn Time - 90 Day Warranty

*Water/physical damage and housing parts NOT included.

1748 Independence Blvd.
Suite B-6
Sarasota, FL 34234

P&W Paging & Wireless Service Center

800 822 2180
pwservice.com

WANTED
TWO-WAY RADIO DEALERS
REWARD
LARGE PROFITS

Uniross a dedicated LMR battery manufacturing company has entered the North America Market and is looking for dealers wanting to represent a company with distribution channel integrity; bringing profits back to the dealers

Bay Batteries
A Uniross Strategic Business Partner
402 Beards Dock Crossing
Annapolis MD 21403
877-UNI-BATT
(877-864-2288)
jmoon@baybatteries.com

Uniross Batteries
Corporate Offices
52D Cumming Park
Woburn MA 01801
866-4-UNIROSS
(866-486-4767)
Ed.McCarthy@Uniross.com

In Canada call 800-267-8895

www.uniross.com

UNiROSS
The rechargeable specialists

Meet us at IWCE Booth # 8062

CIRCLE #213

Cornerstone SMR, Inc.

Two-way radio dealers are invited to call us to discuss revenue generating opportunities.

We primarily operate 220 MHz systems in many areas. With our business partners we provide dealers with competitive communication solution packages including radios, voice and data technologies, dealer incentives and marketing assistance.

Licensees are invited to contact us to explore options such as extension of coverage, networking and interoperability.

Cornerstone SMR, Inc.
www.cornerstonesmr.com
(866) 290-8185, ext. 220

CIRCLE #214

LOOKING TO BUY

220radios.com

220 MHz Equipment Wanted!

We pay cash for new and used SEA equipment. Radios or repeaters are welcome.

Other equipment such as combiners, antennas, controllers such as Trident, and Smartlink or Passport network switches. We are also interested in equipment for point-to-point communications links. Visit our website for more information at www.220radios.com.

Please call 954-484-4084 - ask for Ron or Wayne for more information.

CIRCLE #215

Looking to Buy
Used Motorola Equipment

HT750-LS	UHF (403-470 Mhz)
HT1250-LS	UHF (450-470 Mhz)
CT450-LS	UHF (450-512 Mhz)
P1225-LS	UHF (450-470 Mhz)
EX600-XLS	UHF (403-470 Mhz and 450-512 Mhz)
HT1550-XLS	UHF (403-470 Mhz and 450-512 Mhz)
M1225-LS	UHF (450-474 Mhz)
CDM1550-LS	UHF (403-470 Mhz and 450-512 Mhz)

Ratelle Communications
Oakville, Ontario, Canada
Fax: 905-337-9711
email: sales@ratelle.com

EQUIPMENT FOR SALE

talkfar *Online Marketplace for Radios*

"The eBay of Two Way"

Free *- No Listing or Transaction Fees* New!

Fast *- Instant Contact with Buyers & Sellers*

Buy & Sell excess Radios, Parts & Accessories

info@talkfar.com www.talkfar.com 866-944-TALK

SEE US AT IWCE BOOTH #6074 CIRCLE #216

WE BUY
USED GMARC RADIOS!
Really!
WWW.USED-TMX.ORG
1-888-826-7807

PC COMMUNICATIONS, INC.
Specializing in Buying and Selling
Used / Refurbished Motorola Two-Way Radios

Rentals
Complete Radio Systems
Top Quality Motorola Aftermarket Batteries

ALL PRODUCTS ARE GUARANTEED

720-219-8898 paulcho@qdscorp.com

ACTION CLASSIFIEDS
1-800-548-5536
Ext. 13

EQUIPMENT FOR SALE

35% OFF & MORE!

1-800-822-6677

iLoveRadios.com

Fair shipping prices

Check out Motorola's CP150 & CP200 portables.

PORTABLES MOBILES BATTERIES

CIRCLE #217

Merry Electronics
When You Talk We Listen

Microphones for a Mobile Society
Merry Sounds Excellence

OEM - ODM

Merry Electronics is an OEM-ODM manufacturer of microphones for Two Way Communications Equipment Manufacturers.
Are you looking for a specific microphone to fit your specification?
Merry Electronics can do it.
We are one of the best kept secrets in the communications industry.

Merry Electronics (USA) Co Ltd
15360 E Valley Blvd
Industry, Ca 91746
Phone: 626-333-8985
Toll Free: 888-MERRYUS (637-7987)
Fax: 626-333-0215
Email: merryusa@aol.com
Website: www.merry.com.tw

SEE US AT IWCE CIRCLE #218

The Biggest Inventory of Two Way Radios and Accesories in the U.S.A.

3 Years Warranty

✓ Full Featured
✓ Higher quality
✓ Inmediate delivery
✓ Lower prices than used radios !

ICOM
SUPER DEAL
(Only for Dealers)

IC-F14S. Portable VHF Radio, 2Ch, 5W, Complete. $253.00
IC-F24S. Portable UHF Radio, 2 Ch, 4W, Complete. $273.00
IC-F14. Portable VHF Radio, 16Ch, 5W, Complete. $273.00
IC-F24. Portable VHF Radio, 16Ch, 4W, Complete. $287.00
IC-F121S. Mobile VHF Radio, 8Ch, 50W, 136-174MHz. $339.00
IC-F221S. Mobile UHF Radio, 8Ch, 45W, 440-490MHz. $359.00
IC-F121. Mobile VHF Radio, 128Ch, 50W, 136-174MHz. $369.00
IC-F221. Mobile UHF Radio. 128Ch, 45W, 440-490MHz $389.00

We stock thousands of portable, repeaters and mobile radios !

EPCOM ask for our Catalog !

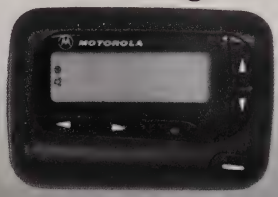
1630 PAISANO DR. EL PASO, TX., 79901, U.S.A. Ph (915) 533-5119, FAX 542-4701
www.epcom.net E-mail: sales@epcom.net

SEE US AT IWCE Booth 13001 / ISC Booth 24091 Circle #220

CANYON RIDGE Communications, Inc.

Quality NEW and Refurbished MOTOROLA Pagers are still available!!!

4045 W. Quail Ave., Suite 7
Las Vegas, NV 89118
702-736-3683 702-736-4851 (fax)
www.canyonridge.cc
email: canyonridge@msn.com
877-736-3684



Advisor II
Advisor Gold Keynote
Advisor Pro Bravo Plus
Memo Express Bravo LX

We only use OEM Motorola Housings
Pager Repair Available

UHF, VHF, 900 MHz
Custom Frequencies Available

SEE US AT IWCE CIRCLE #219

RADIO TUBES - Buy & Sell

2500 Types in Stock

TYPETRONICS

PO Box 8873 Ft. Lauderdale, FL 33310-8873

Send for List

ph: 954-583-1340 fx: 954-583-0777

Dalman Electronic and Software Engineers OEM

GPS Referenced Frequency Generators.
http://www.satsync.co.uk

Simulcast infrastructure equipment.
http://www.dalmants.co.uk

SEE US AT IWCE CIRCLE #221

Buy-Sell Used 2-Way Equipment

BUY & SELL:

LTR-800 MHz & 900 MHz

Kenwood • Motorola • UHF • VHF

• 800/900 MHz • Site Equipment

STERLING ASSOCIATES INC *Specialists in Nationwide Purchasing and Sales of Used Two Way Equipment since 1995*

1-800-786-2199

Fax: 972-562-7957

Email: malone@onramp.net

www.usedtwoway.com

Buy-Sell Used 2-Way Equipment

Buy-Sell Used 2-Way Equipment

Buy-Sell Used 2-Way Equipment

CIRCLE #222

Transcendient

CTCSS ENCODERS/DECODERS
SINGLE TONE/MULTI TONE ENCODERS/DECODERS
INCLUDING STATION ID AND TIME-OUT TIMER
MINIATURE SIZE AND LOW POWER

WWW.TRANSCENDIENT.COM
(973) 209-1498
SALES@TRANSCENDIENT.COM

CIRCLE #223

Exclusive Technology Superior Performance Built to Last

Cellular/PCS Antenna – No Need to Anticipate What System is Available

- Antenna operates simultaneously on the cellular 821-896 MHz and the PCS 1850-1990 MHz bands
- Exclusive Phantom 3dB MEG field diversity performance characteristics counteracts signal fading
- Multiple applications - public safety, transportation networks, utilities and industrial facilities

Phantom GPS for Automated Vehicle Location Applications

- Patented technology counteracts signal fading
- 3dB MEG gain mini omnidirectional antennas in a much smaller package
- 28dB active GPS patch is highly sensitive for accurate timing and locating
- Integrated ground plane mounts to nearly any surface
- The perfect low visibility solution for police, truck trailer and heavy equipment AVL applications

Cellular/PCS Fiberglass Base Station Antenna

- Convenient and highly durable solution for base station or micro base station applications
- Superior quality design through heavy wall gold anodized aluminum mounting sleeve and white UV treated fiberglass radome
- Unity gain performance in the 821-896 MHz band and 3dBd in the 1850-1990 MHz band

Clients include: Boeing, Siemens A.E., U.S. Army, U.S. Forest Services, California Highway Patrol, Pennsylvania State Police

ANTENEX

www.antenex.com
800-323-3757

2405-2411 Glenlivet Drive • Glendale Heights, Illinois 60139 U.S.A.

SEE US AT IWCE CIRCLE #224

Hello ENTELEC Attendees!

USED 2-WAY COMMUNICATIONS EQUIPMENT

Scott Communications *"Worldwide Specialists in 800/900 Infrastructure"*

Motorola and LTR Trunked Systems
Type I II SmartZone Controllers • Controller Boards
Quantar, Quantar (Intella) MTR-2000 - MSF-5000-Viking VX
mobiles • portables • base stations • repeaters
Turnkey systems and installation available (worldwide)

Ken Scott +1.406.745.3218 (voice and fax)
e-mail: kenscott@scottcomm.net www.getaradio.com

CIRCLE #225

NATIONAL RF, INC.

RNF

Manufacturer of Communications Equipment

- *RF Direction Finders*
- *Test Equipment*
- *Antennas*

858-565-1319 Fax 858-571-5909
www.NationalRF.com

CLASSIFIEDS

WHY PAY MORE

Air Comm: First in Quality - Price - Selection - Satisfaction

SAVE THIS AD

NEW *

Motorola
"Spirit"
UHF 1w 1Ch
(MU11C)
w/Accessories
$100
* (New Old Stock)
Offer Expires 4-30-05

NEW *

CT150
136-174 MHz
2w 4 Ch $180
w/Accesories

CT450
5w 16 Ch $300
w/Display/DTMF
* w/Factory Warranty

RECOND.

Motorola Maratrac
VHF 100w
99F
w/Accessories
(T73XTA)
$350

RECOND.

Motorola VISAR
403-470 MHz
4w 16F
Radio/Ant. Only
$200
2-Unit Charger
$40

RECOND.

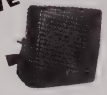
Motorola HT1000
403-470 MHz
4w 16F
Radio/Ant. Only
$250
Tri-Chem Charger
$40

RECENT ARRIVALS: MOTOROLA ACCESSORIES

NEW SAVE 30%

"SPECTRA"
Remote Mount Cable
HKN4356B
$95 ea
(Qty Pricing Available - CALL)

NEW SAVE 45%



15w Speaker for "SYNTOR X" Series Mobiles
HSN 4018
$20 ea

NEW SAVE 33%

403-520 MHz Antenna for HT1000/MT2000 Series
NAE 6549AR
$10

NEW SAVE 25%

"SM"/"M1225" Etc series microphone
HMN 3040B
(equivalent to HMN 3174)
$22 ea OR 3 for $60

NEW SAVE 23%

"M" Series Etc. POWER CORDS
HKN 4137
$10 ea OR 10 for $95

Motorola Accessories - Portable

Model	Description	N/R	Unit $
P1225/GP300	1-Unit Slo Chrgr, HTN9702	N/R	$17/12
P1225/GP300	1-Unit 90 Min Chrgr, HTN9042	N/R	$35/25
P1225/GP300	1-Unit 1 Hr Chrgr, HTN9630	N	$35
SP50	1-Unit Rpd Chrgr, HTN9014	R	$20
HT750	1-Unit Rpd Chrgr, AAHTN3000	N	$30
HT750	6-Unit Rpd Chrgr, NTN9005	R	$250
HT1000	1-Unit Tri-Chemistry Chrgr	R	$40
HT1000	6-Unit Rpd Chrgr, NTN1177C	R	$250
VISAR	2-Unit Rpd Chrgr, NTN7150	R	$40
XTS	XTS Tri-Chemistry Chrgr	R	$45
STX/MX	1-Unit Rpd Chrgr, NLN8858	R	$10
STX/MX	6-Unit Rpd Chrgr, NTN4832	R	$40
HT600	6-Unit Rpd Chrgr, NTN4668	R	$150
SPIRIT/SP21	1-Unit Slo Chrgr, HTN9046	R	$10
SPIRIT/SP21	Remote Spkr-Mic, HMN8432	R	$25
SPIRIT	Flex Ear Rcvr (Blk) HMN9032	N	3/25
STX	Remote Spkr-Mic, NMN6176	R	$20
CP200	Rapid Chrgr XMR, EPNN 7994	N	$9
CP200/P1225	VHF Helical Ant. 146-174 MHz NAD6502	N	$5
CP200/P1225	VHF Helical Ant. 136-151 MHz	N	$3
CP200/P1225	Stubby Ant. 151-159 MHz HAD9742	N	$5
CP200/P1225	VHF Tuneable 136-175 MHz, HAD9742	N	$5
JEDI Etc	900 MHz Dipole Ant., 85-5884R02	N	$12

Motorola 800MHz "SmartNet" & "Privacy Plus" Trunking

Model/Description	Type	Unit Price
MSF5000 75w (C65CXB5103BT)	S/N	800
MSF5000 75w (C65CXB7106BT)	P/P	700
MICOR 70w (C55RXB5103SP700)	S/N	300
MICOR 70w (C55RCB5103SP700)	S/N	300
MICOR 70w (C55RCB5103A)	P/P	300
MICOR 70w (C55RCB1105A)	Conv	300
SYNTOR-X Local Consolette Base (L35VLB5174SP01)	S/N	200
STX821 (H35WK/PA5170)	S/N	50
STX800 (H35WPA5175)	S/N	50
STX (H35STC5170)	S/N	50
MTX800S (H25JPA/B5170)	P/P	25
MAXTRAC 15w (D35MWA5GC3/6) (Radio Only)	S/N	75
SYNTOR-X 15w (T45VLJ5611)	S/N	50

MISC. ITEMS

Central Controller, P/P 5 Ch $2000/OBO

Central Controller, 7-S/N & P/P (T5076/D132SP) $3000 (CALL FOR EQUIP LIST)

Spare Controller Board (N.O.S.): $300/OBO
ACB (QRN6888), IRB (TRN8662), MCB (TRN9968B), RIB (TRN8661A), RSC (TRN9968A), PLIB (TRN5683), TCI (TRN9968/TLN3033), TIB (TRN8663A), TRIB (TRN5689A), DTRIB (TRN5685B aka ZETRON 901-9386)

CENTRACOM II Consoles w/12-13 channel Control Modules (QTY 3) B/O

NEW

MOBILE ANT CABLE
w/Brass Mount - -
14 ft, Stranded w/o Conn.
Major Manufacturer
$6 ea OR 10 for $55

NEW *

Motorola
"LTS2000"
367-395 MHz
$200
Trunking or Conventional
Smartnet or SmartZone
Model: H01EDH4DC5
* (New Old Stock)

AIR COMM
TWO-WAY RADIO SALES
www.air-comm.com

CALL/FAX FOR OTHER RADIOS & ACCESSORIES!
PHONE: 602-275-4505 • Fax: 602-275-4555
E-mail: sales@air-comm.com
4614 East McDowell Road Phoenix, AZ 85008

SAVE THIS AD

BUYING ERICSSON - GE EQUIPMENT

ORDER NEW M/A-COM SERVICE PARTS WITH $20.00 ORDER MINIMUM.

Also stocking 12,000 line items discontinued Ericsson/GE parts.

ORION hand controller NEW	$400
ORION 35-50 mobile 100w	$495
MASTR III station modules	CALL
RANGR desk top stations	from $300
Monogram edacs mobile complete	$175
MRK I edacs portable	$250
MRK II edacs portable	$375
MPA edacs portables	from $250
MPD edacs portables	from $200
LPE-200 800 EDAC	from $650
LPE-50 800 EDAC	from $550
LPE/JAGUAR 700P vehicular chgr	$80
MDX PM82SN EDAC mobile w/acc	$295
PCS/MPA/LPE/KPC rapid multi-chgr	$175
VHF/UHF/800 Voting aux rec.	$250
MLSH040/041 VHF MLS w/accessories	$150
MDX UHF w/accessories	$225
MDX VHF w/accessories	$225
RANGR/DELTA Accessories	CALL
ORION and MASTR III	CALL
RANGR 440-470 100w less accessories	$175
DELTA-SX 150-174 less accessories 100w	$99

NEW LONDON TECHNOLOGY
752 Alum Springs Road • Forest, VA 24551
TEL: 434-525-0068 • FAX: 434-525-0078
www.newlondontechnology.com
E-Mail: ge4ever@netwaveva.com

CIRCLE #226

NEW Pagers
Available NOW!
SWISSPHONE
The Q-1 Fire Pager
Rugged and Field Tested around the world!
Crystal Controlled, Wide or Narrow Spacing!
4 minutes of voice storage, 16 alerts, Backlit Display
Pushbuttons-NOT knobs, Loud and clear audio.
For more info visit us: pwservice.com
Or call: 800 822 – 2180
P & W Service Center, Sarasota, FL

EQUIPMENT FOR SALE

100	EF Johnson 8600/8604 LTR Mobiles
2 ea.	Telewave 800 MHz, 5 Ch Transmit Combiner, Receiver Multiplexer
2 ea.	Telewave 800 MHz, 10 Ch Transmit Combiner, Receiver Multiplexer
2 ea.	TX-RX 800 MHz, 10 Ch Transmit Combiner, Receiver Multiplexer
6 ea.	DB Products DB806, 8db Gain Base Station Antenna
1 ea.	Hark SI550 Router
1 ea.	Hark SI350 Router
50 ea.	Tellabs 4410 pad/xformer cards
5 ea.	Tellabs 1012UC Card Shelves
20 ea.	Grainger DTL Mux Shelves
50 ea.	Grainger DTL Mux Cards
5 ea.	Trident TNT 120 Controllers

• • MAKE OFFER • •
NO REASONABLE OFFER REFUSED
Call 208-522-0750 - ask for Tony
or
email: tony@tetoncommunications.com

SEE US AT IWCE CIRCLE #227

CLASSIFIEDS

SEE US AT IWCE CIRCLE #228

PIT CREW RACING™

RACING GEAR!

Titan™

- Ideal for PitCrew members
- Includes 2 ports so you can connect both a Scanner and also any Walkie or Nextel
- Extreme noise canceling
- Available in yellow, black or red

Headsets

- For 2-Way Radios, Scanners, Nextel phones

Apparel

- Jackets
- T-Shirts
- Hats
- Ladies Tops

Carry Cases & Utility Belts

- Universal Fit
- Heavy Duty
- Steel Clip
- Utility Belt

CUSTOM MADE WITH YOUR LOGO!

Hearing Protectors

- ANSI S3.19
- EN352-1: 1993
- NRR Value: 27dB
- SNR Value:30dB
- Black or yellow

U.S.: 800.959.2899 • Int'l: 760.781.3220

PitCrewRacing.com

SEE US AT IWCE CIRCLE #229

CLASSIFIEDS

WHY PAY MORE

MOTOROLA

RECONDITIONED
W/New Housing, Battery and Antenna

SP 50 PORTABLE

SP50+
VHF (150-174 MHz)
or
UHF (450-470 MHz)
2 Channel 2 Watt
Incl: 600 MAH Battery
w/Wall Charger **$135**
w/Rapid Charger **$160**

SP50+

SP50+
2 Channel 5 Watt
Incl: 1000 MAH
NiMH Battery
w/Wall Charger **$140**
w/Rapid Charger **$165**

SP50 "STD"

SP50
AS ABOVE
2 Channel 5 Watt
w/Standard
Housing/Battery
Slow Charger **$160**
Rapid Charger **$170**

AIR COMM
602-275-4505
4614 E. McDowell Rd
Phoenix, AZ 85008
Fax: 602-275-4555
e-mail: sales@air-comm.com
www.air-comm.com

HANDHELD BARGAINS

NEW HANDHELD RADIOS WITH ANTENNA, BATTERY, CHARGER

CONVENTIONAL 16 CH.	LIST	DLR
HyTek 4 WATT VHF	$199	$119
HyTek 4 WATT UHF	$199	$119
UHF LTR TRUNKED		
Uniden SPU554KTST, 4 WATT	$498	$179
ICOM F4TR, 4 WATT	$565	$199

ELECTROCOM, INC.

504-828-1100

Customerservice@electrocom.com
1110 RIDGEWOOD DR. METAIRIE, LA 70001

Want to join our growing family of Classified Advertisers?
It's Economical. It's painfree. It's Crazy NOT to!
Contact Terry today !
1-800-548-5536 Ext. 13
tbelair@radioresourcemag.com

★ LMR 600
(LOW LOSS 1/2" size)
w/PL259 Connectors
on both ends.
3ft: $79.95, 6ft: $81.95,
25ft: $105.95, 50ft: $134.95,
75ft: $164.95, 100ft: $191.95

★ LMR 400
(LOW LOSS RG8 size)
w/PL259 Connectors
on both ends.
3ft: $12.95, 6ft: $15.95,
25ft: $35.95, 50ft: $60.95,
75ft: $86.95, 100ft: $113.95

★ CXP181BFX
(LOW LOSS RG8 size)
w/PL259 Connectors
on both ends.
3ft: $14.95, 6ft: $15.95,
25ft: $29.95, 50ft: $48.95,
75ft: $67.95, 100ft: $84.95

★ RG213/U
(HIGH POWER, HF)
w/PL259 Connectors
on both ends.
3ft: $12.95, 6ft: $14.95,
25ft: $25.95, 50ft: $37.95,
75ft: $49.95, 100ft: $61.95

FEATURED PRODUCTS

We stock many other cable types, lengths, and also in bulk.
To view all of our products please visit us on line
www.cablexperts.com or call 800-828-3340

CABLE X-PERTS, INC.
Connecting You to the World...

SEE US AT IWCE

Service shop *On The GO*

CD100

Frequency Counter / Tone Decoder

Portable, compact and easy to use. What more could you want from your test equipment?

How about a frequency counter with built-in sub-audible tone decoding of CTCSS, DCS, LTR and DTMF. Key up any analog radio and the CD100 will instantly display the frequency transmitted as well as the tone or code for that frequency.

Ideal for quickly testing radios in the shop or setting up new radios in the field. No more carrying heavy and expensive equipment to the job site.

$459

Antenna shown not Included

FEATURES

- **10MHz - 1GHz frequency range**
- **Decode CTCSS, DCS, LTR and DTMF**
- **Reaction Tune compatible receivers**
- **100 memories of freq. and tones**
- **Two line LCD with EL backlight**
- **Displays channel and measured freq.**
- **Built-in NiCads for portability**
- **4 hour NiCad operation**

OPTOELECTRONICS

ORDER TOLL FREE: 800-327-5912

5821 NE 14th Avenue
Ft. Lauderdale, FL 33334
Tel: 954-771-2050, Fax: 954-771-2052
Email: sales@optoelectronics.com
www.optoelectronics.com

The CD100 is covered under US Patent No. 5,471,402

SEE US AT IWCE CIRCLE #230

HELLO IWCE Attendees!

COFFEE BREAK AT IWCE

Booth 10035

Stop by the

MissionCritical Communications / RadioResource International

booth before the show opens each morning for hot coffee and friendly smiles to help start your day off right. BRILLIANT!!!

CMC Enterprises Towers, 2-Way, Microwave & Telecom Equip.

We have lots of NEW Andrews Helix, Connectors, Hangers, Ground Straps, etc. Also, Microwave Radios and Multiplex Equipment, and thousands of Tellabs Cards, Ch Modem Cards, and Ch Bank Cards, etc.

Below is only a small list of what we have.

Please don't hesitate to call for price and availability!

Qty	Equipment List	Price Each
50	New Motorola L3151 TNA200 Tone Remote Adaptor	$150 ✻
25	Motorola MT 1000 99 Ch UHF (w/Charger)	$175 ✻
1	Motorola MSF 5000 (174CLB)	$1400✻
1	Andrew 300' Guide Late Model. VGC (w/drawings, comp)	$9000✻
2	350' Roll Andrew LDP650, 1 1/4", (NEW)	$1400✻
30	Motorola HT 1000 Convertacom w/RF Amp VHF	$125✻
5	Motorola Spectra 900 MHz	$300
6	Starpoint 6000 w/Hot Standby	$2500
5	NEC TRP 11G 135 MB 6-800B	$2000
10	24V - 100 Amp C&D Power System ART Series	$500
1	IFR FM/AM 1500	$3000
10	Harris Farinon DMV-6-45 (28 T1) 6 Ghz	$3000
10	Avontek (Telesciences) DR2D 4 T 1 2.1-2.3 GHz	$1500
6	Alcatel 18 GHz 8 T 1	$1500
18	Motorola Spectra UHF 110w Advanced (w/Siren Pkg)	$400
100	Midland 70-1630B Mobiles (VGC)	$60
30	Used (VGC) 300MM Tower Beacons	$275
20	Tower Beacon Flasher Control Units (VGC) Pyrod	$325
100	Smartnet Type 1 35w Maxtrac 800 GC Complete	$125
50	Motorola Starplus Channel Modems MLN 6625	$225
50	Motorola Starplus Channel Modems (TX) QRN 4535A	$125
50	Motorola Starplus Channel Modems (RX) QRN4537A	$125

✻ *New Listing* ✻

Call Charles at 336-769-2885

BATTERIES & RADIO SALE!

NEW! Lowest Pricing on Radios & Batteries WE EXPORT!

VERTEX-ICOM-BENDIX KING/RELM

NEW! 128 Channel Mobiles
50w VHF / 45w UHF ALPHA DISPLAY
12.5/25kHz SCAN
$299.00 VHF or UHF

PORTABLES! *VHF 5w 128 Channels* ***$249.00***
Incl: Radio, 1500mAH Batt, & Rapid Charger!

Batteries for MOTOROLA

CW7144	(Rep NTN7143/44)	1500mAH NiCD	$22.00
CW7144XX	*Ultra High Cap!*	2700mAH NiMH	$38.00
CW4851	CP150/200	1400mAH NiMH	$35.00
CW9008MH	HT750/1250/1550	1500mAH NiMH	$30.00
CW8294MH	XTS3000/3500	2100mAH NiMH	$38.00

Complete line of aftermarket and OEM Batteries for most Radios. If you don't see it ... CALL!
Complete line of 2-Way Radios and Accessories!

MOTOROLA - VERTEX - ERICSSON

BATTERY SPECIALS!

GP300	CW9628	1200mAH NIMH	$24.00
XTS2500	CW9815	1700mAH NICAD	$44.00
P1225	CW9049	1500mAH NICAD	$25.00
P110	CW8148MH	1650mAH NIMH	$25.00
For EF JOHNSON ("CL" SERIES)			
CW171		1400mAH NICAD	$50.00
CW171MH		2700mAH NIMH	$60.00
For ERICSSON / MA/COM			
KPC/LPE PRISM	CW1203MH	2000mAH NIMH	$37.00
KPC/LPE PRISM	CW1202MH	2400mAH NIMH	$51.00
For KENWOOD			
CW5615		1200mAH NICAD	$22.00
CW5615MH HIGH CAP		2000mAH NiMH	$30.00

All Batteries made in the USA!

(800) 264-9516 • (303) 494-1080 • (303) 499-2870 Fax **E-mail: sales@commswest.com**

LOWEST PRICES ON BATTERIES & RADIOS! www.commswest.com

CIRCLE #231

$$ HIT THE JACKPOT $$

With

NEW VISARS

- One Year Factory Warranty
- Model #H05RDD9AA4DN
- 403-470 MHz, 16 Channel
- Battery - NTN7394C NEW
- Standard Antenna, Holder and Dual Charger

$449 NEW IN THE BOX!!

ComSource
INCORPORATED

MOTOROLA
Authorized Two-Way Radio Dealer

2005 iWCE

Call: 248-853-5430 Fax: 248-853-0310
daryljackson@comsourcemi.com
2130 Austin Drive Rochester Hills, MI 48152

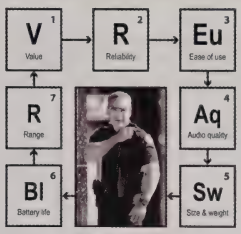
MOTOROLA
intelligence everywhere™

Seven Essential Elements of Solid Two-Way Communication

One Radio Series Combines Them All.

CP150
CP200

Commercial Series
Two-Way Radios and Accessories



With the Radius CP150™ and CP200™ portable radios, you get solid two-way performance at a very competitive price. Clear, crisp audio and customizable features let you communicate exactly how you want. A rugged, ergonomic design ensures exceptional reliability and comfort, no matter where your work takes you. And a variety of power options lets you pick the calling range that works best for your business.

Call **Location Sound Corp**. today about the CP150 and CP200 radios.

MOTOROLA and the Stylized M Logo are registered in the US Patent and Trademark Office. All other products or service names are the property of their respective owners. ©Motorola, Inc. 2005

Get your CP150/CP200 portable radio or other Motorola 2-way radio and accessories at

LOCATION SOUND CORP

SALES • RENTAL • SERVICE

MOTOROLA
Authorized Two-Way Radio Dealer

Phone: (818) 980-9891
Outside CA: (800) 228-4429
www.locationsound.com

Rent the CP200 for $10 a day ... a perfect way to try the radio! Call x338 for this option.

Location Sound Corporation
10639 Riverside Drive • North Hollywood, CA 91602

CIRCLE #232

Webster

Since 1974 Your Factory
AUTHORIZED BIRD DISTRIBUTOR

115 BELLARMINE, ROCHESTER, MI 48309
Toll Free: 800-521-2333 Fax: 248-375-0121

CIRCLE #233

ACTION CLASSIFIEDS
1-800-548-5536
Ext. 13

• MOBILES • BASES • PORTABLES • PAGERS • REMOTES

BUY • SELL • TRADE

PCI--PEKAAR COMMUNICATION LLC
NEW Phone: (973) 726-7295

GE • MOTOROLA • RCA

KENWOOD TK730HG 110W Hi Band w/accessories. $250
GE MRK Portables M#PK2HGC Hi Band w/btry & ant. $150
GE MLS Mobiles Hi Band with mic and bracket $125
GE Ranger 150-170 range 40w Hi Band less accessories . .$35
GE Rangers, 30-50 MHz, 100w with accessories $250
GE PMU Mobiles M#PMU45A UHF 450-470 MHz w/Mic ..$225
Kenwood Mobiles Lo Band 42-50 range TK630H 100w w/accessories. Front mount or rear mount $250
GE Phoenix Mobile N5HH1W40TB Hi Band w/ grey case w/accessories $99
GE Master II 800 MHz EDAT Continuous Duty PA's $45
Astron Power Supplies 11 amp $15
GE Rangers 36-50 range, 60w, w/accessories $100
Midland Mobiles M#701530B UHF w/Mic $100
GE Monogram Portables UHF w/antenna, less battery $50
GE PCS Portables, 450-470 w/battery & antenna $78
GE Ranger Table Top Bases Hi, Lo, or UHF Bands $200
Kenwood Chargers KSC15 or 16 .....$15
Motorola Pagers Director II Hi Band on 152.30 MHz w/chgr .$30
Rangers UHF 450-470 range 100w w/accessories $225
GE Delta Mobiles 40w Hi Band, Lo Band or UHF less acc. .$25
GE Phoenix Mobiles 150-170/Beige color, w/accessories . .$98
Deskon II Remotes Tone or DC $20
Maxon Portables Hi Band 150-170 range 16 freq w/battery, antenna, charger and mic. M# SP2550SM $125

Catalog Available *If you can't find it, try us!* Call (973) 726-7295

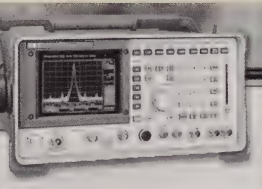
• BOARDS • STRIPS • ACCESSORIES • ELEMENTS • REEDS •

CIRCLE #234

Test Equipment Connection Corporation

OPEN 24 HOURS

Specializing In Communications Test and Measurement Equipment



BUY SELL RENT REPAIR TRADE

HP - TEKTRONIX - MOTOROLA - AGILENT - IFR - WAVETEK - CUSHMAN - AND MANY MORE!

CALL: +1 800-615-8378 FAX: +1 800-819-8378

www.TestEquipmentConnection.com

CIRCLE #235

GN BATTERIES

LEADER IN COMPLETE LINE OF BATTERIES AND CHARGERS

Every portable device needs dependable and powerful battery packs.
At GN Batteries, we design our batteries with highest quality & technology that make batteries run and last longer.
GN Batteries also specialize in customize batteries and chargers.

2-WAY RADIO, FRS & PAGER BATTERIES

- ✓ High quality & certified Japanese cells
- ✓ Warranty on purchases
- ✓ Welcome government / school purchases
- ✓ OEM, ODM & Private label
- ✓ Battery pack assemblies
- ✓ Blister & clam shell packaging

SANYO/ PANASONIC CELLS INSIDE

100% OEM COMPATIBLE

HiTECH® STREAMSONIC®

NEW

2-Way Radio Belt Clips
2-Way Radio Batteries Single Standard Charger / Single Rapid Charger
6-Bank Chargers for Motorola Radius GP-300/GP-350 (HNN9628A/HNN9360A) Batteries.

Other batteries available for digital camera, cordless phone, computer, barcode scanner, etc..

GN USA

GN BATTERIES 3207 Pomona Blvd., Pomona, CA 91768
Phone: (909)598-1919 . (800)321-1266 | Fax: (909)594-7938 . (909)598-3837
www.gnbatteries.com info@gnbatteries.com

CIRCLE #236

Winter 2 for 1 SALE or up to 50% OFF

EVERY PIECE OF USED EQUIPMENT IN STOCK!

Visit our website for a complete, updated list of ALL items in stock:

www.barnettelec.com

CALL ON PHONE FOR SPECIAL PRICES 800-423-3858

DAYS 8-4 CST MON-THURS. IF BUSY, KEEP TRYING!

Min order $200 + Shipping • VISA/MC • NO COD's

1000	CENTRACOM II cards, cabinets, systems	.50% OFF
40	MOTOROLA Trunked System Controller & Cards	CALL
45	800 MHz Combiner 5 Ch, CELWAVE	.FROM $500
175	900 Trunked GTX MAXTRAC Mobiles 15-35w	.CALL
10	SPECTRA UHF 40w 128 Ch	$295
40	MARATRAC 8/99 Ch 110w 42-50 MHz & UHF	FROM $295
200	MASTER II VHF/UHF/30-50 MHz	CALL .FROM $50
100	MICOR & MASTR II Base/Repeater - All Brands	CALL
4	SPECTRA 100w VHF 128 Ch	.FROM $395
16	MDS - TLU28 450 MHz 8 Ch 40w	$100
6	MSF-5000 UHF 450 Repeater 15-100w	.FROM $995
15	MOTOROLA SmartNet 800 MHz System. Complete w/Controller, Combiners, 35-150w Rptrs	FROM $4,995
20	UNICOM 118-135 MHz AM 10w, Mentor	.FROM $100
150	MASTER II, LB/VHF/UHF Mobiles	.CALL
30	155w 800 MHz PA DBP155CM2A-G Wide Band Solid State	FROM $500
3	MSF-5000 UHF C74CLB 110w Repeater	$1995
6	STARPLEX 2 GHz microwave	.CALL
2	STARPLEX 6 GHz microwave	.CALL
100	STARPLEX MUX Racks w/MLN6287 / MLN6288 Full	
20	TPL 250w 850 MHz PA	$750
25	EX II VHF Base Station	$100
10	SPECTRA 900 Trunked 15-35w	$100
25	SYNTOR X Table Top Bases	FROM $100
30	PHOENIX VHF SX 16 Ch	.FROM $50
20	VEGA - DTMF Switches	FROM $100
50	SPECTRATRAC Receiver, Voter - New	SALE CALL
6	SPECTRATRAC Comparator TRN1786	.CALL
6	RANGER/DELTA Bases 100w 2/Scan	$250
100	MICOR VHF 100w 12 Ch w/Acc	FROM $50
100	SYNTOR X VHF 100w 32 Ch w/Acc	.FROM $100
10	DELTA SX VHF 110w	FROM $100
100	SYNTOR X 9000 cables	.FROM $25
500	SYNTOR X 9000 800 trunked type I/II & Conv	.SALE $100
400	MOT PAC-RT Repeater VHF	SALE FROM $25

Barnett Electronics Inc. 330 HWY 236, Lonoke AR 72086 • **Ph 800-423-3858**

Fax: 501-676-2475 • Info 501-676-5506 • Hrs 8-5 M-F CDT

www.barnettelec.com email: bobb@flash.net

Please tell our Advertisers you saw their ad in RadioResource MissionCritical COMMUNICATIONS

Data To Go - Safe & Secure

MOBILE MOUNTS

Unique, patented, easy to install modular mobile mounting systems!

Allows almost any communication or data device to be mounted where you want in most vehicles including aircraft!

Available for:

•Laptops	•Cell Phones	•Radios	•GPS
•Blackberry	•iPODS	•Nextel	•PDA's

Now Available! Power Port Mounts

Holds, Secures,
Runs device and Charges Battery

High capacity batteries at discount prices available for most devices.

BATTERY TECH INC

WWW.EBATTERYTECH.COM

Phone: 516-496-9520 Fax: 516-496-9523

Website: ebatterytechmounts.com

800-442-4275

CIRCLE #237

EQUIPMENT FOR SALE

UTILITY COMMUNICATIONS, INC.

2-Way Products and Services for over 35 Years

Two-Way Radios • Cell Phones
Portable Rentals • Nextel Wireless
Pagers • Custom Engraving
Vehicle Locating Systems
Reconditioned Equipment
Emergency Vehicle Lighting
Radar Sales-Service-Calibration
In-Car Video Systems • GPS
Scanner Sales & Service • Leasing
Consulting • Complete Motorola Product Line

MOTOROLA Authorized Two-Way Radio Dealer

(203) 287-1306 (800) 443-1306
www.utilitycommunications.com
920 Sherman Ave. Hamden, CT 06514

AUTOMATIC ON/OFF Delay Timer — THE ORIGINAL by COMM-NET 2000

2-Way, Cellular, MDT, AVL, GPS & Computer

Mounting Case Included
DG200 - $38

- Helps eliminate battery failure/replacement
- Programmable 15 minutes to 12+ hours
- Handles 30 continuous amps at 12 volts
- Ignition connection for positive control
- Easy to install / 1 year limited warranty
- Totally sealed relay—Nothing else to buy
- Serviceable/Repairable
- Protected Screwdown Terminals
- *All products hand assembled and soldered*
- *Family owned & operated since 1985*
- Proudly made in the USA

(800) 283-5158 fax (800) 337-6475
www.makewebs.com/comm2000
Email: comm2000@jeffnet.org

Tested and proven on police, fire, EMS, utility, government and business vehicles

CIRCLE #238

LA RUE COMMUNICATIONS

MasterCard VISA

Used Radio Equipment BOUGHT AND SOLD

LaRue Communications
1033 Highway 49, San Andreas, CA 95249
Call: 1-800-811-4241 209-463-1900
Fax: 209-463-1981
email: klarue@laruecomm.com

We Buy and Sell New and Used Test Equipment.

1-800-476-2526

We can SAVE you money!!

Alcom Electronics, Inc.
2801 17th Avenue, Gulfport, MS 39501 USA
e-mail: sales@alcomtest.com www.alcomtest.com

CIRCLE #239

Motorola Super Radio Sale

All NEW radio pricing starting at

VL50	*now ..*	$165.00
VL130	*now ..*	$227.00
CP100	*now ..*	$179.00
CP150	*now ..*	$208.00
CP200	*now ..*	$275.00

plus dollar points & a special discount code: RR2005

Over 100,000 Motorola items Online!

MOTOROLA ORIGINAL

The new ...

www.MyRadioMall.com 1-866-900-Mall

Pre-Owned 2 Way Radio Equipment

Qty.	Description	US $ each
102	Motorola VHF Systems SABER III Handheld Radios w/Securenet, DES, NiCad, Desk Chgr & Ant. 136-150.8 MHz, 6w, 120 Ch, 10 Zone. H43TUK5170CN. In Very Good Condition	$CALL
140	Motorola VHF SPECTRA Underdash Mobile Radios w/Mic, Bracket, Pwr Cbl. 136-162 MHz, Digital Capable, 40w, 120 Ch, D43KXA7JA4AK. In Very Good Condition	$279
18	Motorola UHF HT-1000 Handheld Radios w/new NiCad Desk Chgr & Ant. 450-520 MHz, 4w, 16 Ch, H01SDC9AA3BN. In Good Condition	$290
16	GE Ericsson ORION Trunk Mount Mobile 29-42 MHz, 16 Ch, 110w, c/w Accys - D2AHG3 - Fully Tested	$349
217	Motorola SPECTRA UHF Range 403-435 MHz Underdash Mt Mobile Radio. 40w, 128 Ch, c/w Accys. D44KMA73A4AK	$179
46	Motorola SPECTRA UHF as above but NEW IN BOX	$249
97	Motorola GP300 UHF 450-470 MHz Handhelds. 5w, 16ch, c/w NiCad, Chgr, Ant. P94YPC20C2AA	$179
15	Motorola P1225LS UHF LTR/Conv. Handhelds. 5w, c/w NiCad, Chgr, Ant. DTMF & Standard Versions	From $149
26	Motorola MSF-5000, 403-435 MHz, 40w Repeater, in 25" Cabinet and Fully Tested. C44RUB7106BT. Duplexers or Multicouplers are available.	$599
20	Motorola MT1000 VHF 136-162 MHz Handhelds. 5w, 99ch, c/w NiCad, Chgr, Ant, Spkr/Mic. H43GCJ190CN	$179
33	Motorola MT1000 VHF 440-470 MHz Handhelds. 4w, 16ch, c/w NiCad, Chgr, Ant, Spkr/Mic. H44GCU7100BN	$169
245	Standard GX-3000 VHF 136-150 MHz, 40w, 64ch Mobiles c/w DTMF Mic, Bkt, Pwr Cbl. Sold in lots of 5 only	$49
7	VERTEX VX-10 VHF Handhelds 148-174 MHz, 5w, 102 Ch, Scan, Alpha Display c/w New NiCad, Ant, Belt Clip, Chgr	$199
85	Ericsson/GE 800 MHz MDX EDACS/90 Ch Conventional Mobiles, PM82SN (16 Sys/GPS). U'Dash or Trunk Mount versions c/w Accys	$275
30	Ericsson/GE 900 MHz MDX EDACS/90 Ch Conv Mobiles PM92SP (128 Sys/GPS). U'Dash Mount c/w Accys	$249
30	Motorola QUANTAR, VHF 132-154 MHz, 125w Base Stn/. Repeater T5365A 115/230 VAC, 50/60 Hz or 24 VDC. Has Wireline interface, Astro compatible. Local Spkr/Mic Kit and Duplexers or Multicouplers are available.	$2,890
5	Motorola QUANTAR, 900 MHz, 100w Base Stn/Repeater T5365A 115/230 VAC, 50/60 Hz or 24 VDC. Local Spkr/Mic Kit Available.	$CALL
90	GE Ericsson ORION 403-430 MHz Underdash & Trunk Mt Mobiles, 40w, c/w Accys - D2PMG1 - As New & Fully Tested.	$349
1	900 MHz GE/Ericsson EDACS System, 72 Chs, c/w LPE200 Portables & ORION Mobiles. Mostly New (100's of them)	$CALL

And much, much more - see our web pages

BRO-COMM (Canada) Inc	BRO-COMM (USA) Inc
Burlington, Ontario, Canada	Venice, Florida, USA
Tel: 888-832-2210 Toll Free	Tel: 866-520-5700 Toll Free
Tel: 905-335-6266	Tel: 941-488-1812
Fax: 905-335-4430	Fax: 941-488-1821
email: sales@bro-comm.ca	email: sales@bro-comm.us
www.bro-comm.ca	www.bro-comm.us

SEE US AT IWCE 2005 - Las Vegas CIRCLE #240

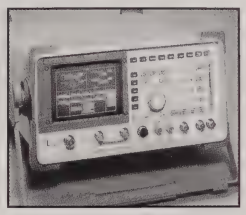
FOR SALE—H-P-8920-A/H-P-8921-A

RADIO SERVICE MONITORS

QUANTITY [29] FOR SALE WITH OPTIONS

[5] H-P-8920-A OPTIONS 2/3/4/5/10/13 .....$8900.00
[13] H-P-8920-A OPTIONS 2/3/4/5 .....$8500.00
[11] H-P-8921-A OPTIONS 1/102/103/4/5/13/14/50 .....$9500.00

- 500KHZ to 1GHZ Frequency Range
- Spectrum Analyzer w/Tracking Generator
- Duplex Generator/Digital/Analog Signaling
- LTR/EDACS/MPT-1327 Trunking Test
- High Stability OCXO
- 6 Month Warranty and a 10 Day Right of Refusal
- Tested and Calibrated



USED TEST EQUIPMENT WANTED,
FAX YOUR LIST TO 702-248-2645

RF IMAGING AND COMMUNICATIONS
800-251-8911 FAX 702-248-2645
www.rfimage.com e-mail: rfimage@best.com

CIRCLE #241

ThinkSmart

ThinkBuyers

Think Action Classifieds

Contact Terry
1-800-548-5536 x. 13
tbelair@
radioresourcemag.com

National Radio

EXTENSIVE LIST **New, Used Radio Sale!**
on website: **www.NATRAD.com/ue**

Mobiles

Quan.	Description	Price Each
1	MCS-2000 Model II 800MHz H38 Dual	$1900◆
1	Desktrac 42-50 MHz 60w **NEW**	.$475◆
1	MCS-2000 Model II UHF 403-470	.$439
17	M-100 2Ch 40w UHF D44LRA73A5	.$145
30	M-120 2Ch 40w UHF M44GMC20A3	.$195
12	SM-50 2Ch 40w 460-490 **NEW**	.$279
4	SM-120 16Ch 40w 12.5KHz 465-490 **NEW**	.$179
19	Spectra UHF 128Ch 40w A5	.$225◆
45	MCX-1000 UHF 56Ch Dashmount	.$145
5	Kenwood TK930 **NEW/USED**	.$125
14	Maxtrac B2 900MHz 30w Priv Plus **NEW**	.$225
15	Spectra C5 Smartnet 35w-rmt avail.	.$350

Motorola Portables

14	GP-1200 450-520 16 Ch 4w **NEW**	.$499
30	P-110 VHF/UHF avail. 2Ch-16Ch	.$149-249
50	HT-600 2Ch / 6Ch VHF/ UHF	.$99-199
45	P-100 2Ch 4w VHF/UHF	.$99
4	HT-750 VHF 2Ch 5w	.$349
10	HT-1000 UHF 16 Ch **IS**	.$395◆
4	GP-300 2Ch 5w VHF 136-162 **NEW**	.$299
10	HT-750 UHF 16Ch 4w	.$399
20	P-1225 2Ch 4w UHF	.$325
99	P10 VHF w/New Batty, Ant, Chgr	.$69

Call to ask about Motorola's NEW Alpha Series Radios

- VHF or UHF
- 16 Ch / 4 Watt
- 8 Char Alpha Display
- Scan
- IWCE *Super Special!*

Call this week - Mention Code 292H

Call Brian TODAY!! 281-443-1999

◆ New Listings ***Make Your Best Offer***

National Radio MOTOROLA Authorized Two-Way Radio Dealer

INTRODUCING WATERPROOF
NEW RADIOS

Icom VHF model F-50 $CALL$
136-174 MHz, 128 Channels, 5 Watts, Scan, Pager, Rapid Charger and 1700mAh battery

Exact dimensions:
$2^{7/32} \times 3^{13/16} \times 1^{7/16}$

- Radios have full 2 years factory warranty.
- Get Discounted accessories and complete specs online!

Call today (800) 977-0448
Or place your secure order online
CCR CAGE CODE 3BMK9
www.nsiradio.com
NSI Communications Inc.

CIRCLE #242

DELAY TIMER

"ON WHEN IGNITION TURNS OFF"

- Battery and Equipment Protection Device
- Monitors Battery Voltage. Low Voltage shuts down load
- Low voltage disconnect (10.5V) - Over voltage protection (17V)
- Used by Police, Fire, Utility, for MDC/MDT, GPS, AVL
- Automatic On/Off • 30 AMP 12 Volt DC
- Made in USA • One Year Warranty

24 VOLTS NOW AVAILABLE

HEAVY DUTY 75 AMP DELAY TIMER - MZL 100

WIG-WAG FLASHER

- Power: 12 volts, negative ground system
- Flash rate: Nominal 1.9 per second on wigwag pattern
- Lamp Wattage Capacity: 180 watts
- Current Output: 15 Amps

AC/DC INDUSTRIES
P. O. BOX 710548, HOUSTON, TEXAS 77271
Tel: (281) 933-0909 • Fax: (281) 933-1001
Toll Free: 800-888-0909
Web-Site: www.acdcind.com E-mail:sales@acdcind.com

SEE US AT IWCE CIRCLE #243

PUBLIC SAFETY PRODUCTS AND SERVICES

Contact Terry today to advertise and get noticed by 19,000+ buyers of Public Safety products and services.

tbelair@radioresourcemag.com
1-800-548-5536 Ext. 13

AUTOMATIC ON/OFF Delay Timer
THE ORIGINAL by COMM-NET 2000

See our ad on Page 146

Keeping the community safe is your job!
Providing the equipment is ours!

ALERT RECEIVER
* Tone/ Monitor Capabilities
* Remote Switched Output
* Over 2 Watts Audio

VEETRONIX

1-800-445-0007

Demos Available
www.veetronix.com

CIRCLE #244

Simulcast SOLUTIONS solves YOUR customer's radio talk out problems

GPS Frequency Sources
Manual / Automatic Audio Delay
Voter Comparators

Free application information – visit www.simulcastsolutions.com or call 585.223.4927

SEE US AT IWCE CIRCLE #245

PUBLIC SAFETY PRODUCTS AND SERVICES

Get Wet.
Speaker mic for the elements
from $49

Get Rough.
Muff headsets (24 dB NRR), detachable cords
from $269

Get More.
Tactical throat mic with interchangeable PTTs
from $97

Get Cobalt.

COBALT AUDIO•VIDEO

1.800.264.6021 www.cobaltav.com

In Canada, contact Charles Richter & Assoc. at 800-966-9555

SEE US AT IWCE CIRCLE #246

Light Bars
Strobes, Sirens and Speakers

Heavy Duty Aluminum Base
Shatter Proof Lens
From Signal and
2-Year Warranty-Custom Selection
800 822-2180
Visit at: pwservice.com
P&W Paging & Wireless Service Center

LIND
Power Accessories for Mobile Computing

Lind Shut Down Timer
Vehicle Battery Protection Device

The Shut Down Timer protects your vehicle's battery from over discharge and equipment from low voltage and high voltage damage.
This device turns OFF electrical loads at a preset time after the car engine is shut down.
The timer starts when the ignition is turned OFF.
(Available for 12 and 24 VDC input systems)

- Easily programmable
- Settable shut down delay time from 12 minutes to 18 hours
- Low voltage shut down at 10.5 (21) VDC
- High voltage shut down at 18 (36) VDC with auto reset
- Loads up to 30 (20) amps at 12 (24)VDC. Two output connections (optionally fused at 15 amps each)
- Reverse polarity protected
- Automatic activation by battery voltage sensing (battery not charging = timer ON)
- Optional activation by ignition switch connection (ignition OFF = timer ON)
- LED indicators for ON, OFF and Timing
- Speed-up time test switch (set delay divided by 100)
- Override switch for 12 minute emergency operation after time out or failure of the engine to start
- Protected against automotive load dump.

For additional details - go to: **www.lindelectronics.com** Look under our Accessories link
Contact your Lind sales representative for additional information and assistance.
Call us at: #800-897-8994

CIRCLE #247

CONSULTANTS

Designing the Future of Communications...

Communications Consultants

INDEPENDENT PROFESSIONAL QUALITY DRIVEN EXPERIENCED

Interoperability Preparedness,
Public Safety Two-Way Radio,
Microwave & Fiber,
Wireless & Wireline 9-1-1,
ECC & EOC Design

CTA COMMUNICATIONS, INC.

20715 Timberlake RD
Lynchburg, VA 24502
434.239.9200
www.ctacommunications.com

SEE US AT IWCE CIRCLE #248

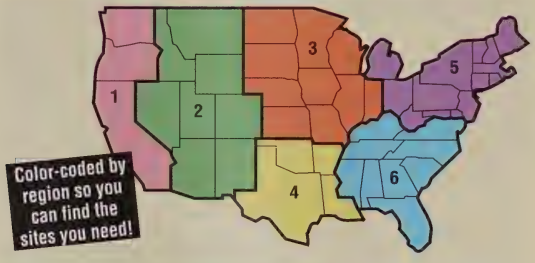
EQUIPMENT SHELTERS AND ENCLOSURES

ENVIRO BUILDINGS

PREMIUM QUALITY COMMUNICATION SHELTERS

STARTING UNDER
$2,500

Call today **(800) 728-5454**
325 Payson Ave., Quincy, IL 62301
Fax: (217) 228-2424
www.envirobuildings.com



Color-Coded Antenna Tower Site Guide

REGION 1

K-Comm
Radio Relay/Repeater Sites
www.k-comm.com
San Francisco-San Jose-Salinas
Reasonable rates. Secure High Elevation Site
Contact: K-Comm (408) 739-7318 or
Howard: Direct (408) 739-7936

REGION 6

(4) Towers For Sale
Hampton - Richmond
Norfolk, Virginia
Over $21,000 Monthly Income
email:
tomblount@accessnet.com

REGION 4

SOUTH TEXAS AREA

Location	Height	Latitude	Longitude
Santa Fe	600'	29-25-11	95-07-40
Rosenburg	400'	29-32-1.0	96-04-5.0
Angleton	475'	29-7-30.0	95-21-25.0
Galveston	200'	29-15-38	94-50-16

CGS Investments, Inc. Texas City, TX
Phone: 409-948-9264 Fax: 409-948-4308

BKT CORPORATION . . . . Since 1953
Providing **PRIME** tower & building sites for the communications industry in central and south Texas for over 46 years.
Contact **Tex Kennedy** for more information.
Phone: 210-653-1440 Fax: 210.654.6993

REGION 5

PRIME WASHINGTON D.C. AREA TOWER SPACE AVAILABLE

Located in one of the nation's largest markets, this tower is among the best sites in the Washington DC area! Just 10 miles north of the nation's capitol building.

Site address:
2647 University Blvd. West
Wheaton, MD 20902
LAT: 39-02-26
LONG: 077-03-19

Located on a secured lot with an air conditioned equipment building.

For information contact:
The High Tower Company
PO Box 2840
Montgomery Village, MD 20886
Ph: 301-208-0940 Fax: 301-208-1796
email: carvertower@aol.com

PROFESSIONAL DIRECTORY

CLASSIFIEDS

CONSULTING

911Insight
233 Wilshire Blvd. Suite 400
Santa Monica, CA 90401-1214
911insight
Management Consulting Services for Consolidation, Shared System Governance, Strategic Planning, Feasibility Studies, Financial Planning, System Selection, Contract Negotiation, System Design, and Project Management.
310.264.6172 Voice 310.264.6173 FAX
www.911Insight.com

ADCOMM Engineering Co.
14631 128th Ave. NE, Woodinville WA 98072
www.adcommeng.com
Providing Engineering and Planning Services in all Aspects of Public Safety Communications
425.821.8827 fax: 425.488.3952

C-Com Consulting Group Inc.
Nationwide Public Safety Communications Consulting
Needs Analysis - RF Engineering - System Planning & Design - Coverage, Interference & MPE Studies -Project Management - Dispatch Centers - Mobile Data - PSAP Consolidation - E9-1-1 / 3-1-1
P.O. Box 587
Marlton, NJ 08053-0587
(856) 983-2567 - F (856) 985-9201
www.c-comgroup.com info@c-comgroup.com

Clarian
Telecommunications Consulting
• Public Safety Radio Consulting • Interoperability Solutions • RF Propagation & Coverage Studies • Requests for Proposals • Project Management
2911 State Street, Ste. B, Carlsbad, CA 92008
760-720-1848 • www.clarianconsulting.com

FCC Issues?
Fox Ridge Has Solutions!
Auctions RF Exposure/Software
Licensing Frequency Searches
Fox Ridge Communications Inc.
Ralph A. Haller, President
122 Baltimore Street, Suite 200
Gettysburg, PA 17325
Phone (717) 334-7991 ◆ Fax (717) 334-5656
www.frci.com e-mail: rhaller@frci.com

Intertech Associates, Inc.
Technology Consulting Engineers
77-55 Schanck Rd., Ste. A-14 Freehold, NJ 07728
www.intertechassociates.com
Ph: 732-431-4236 Fax: 732-780-1597
Engineering services for all RF, Wire/Wireless Communications, Security, E-911 and Dispatch

Lockard & White - Telecommunications Engineers
14511 Falling Creek Ste. 507, Houston, TX 77014
Tel: 281-586-0574 Fax: 281-586-0044
www.lockardandwhite.com
Engineering services for all areas of telecommunications. ***"Out of the box solutions for unique problems."***

CONSULTING (CONT.)

SSI Services, Inc. Since 1989
Communications Consultants
2578 Interstate Dr., Ste. 100 Harrisburg, PA 17110
9-1-1 Communications Systems, Microwave Systems Design, Feasibility/Needs Assessment, Integration, Project Management, Acceptance Testing
800-590-8837 Fax: 717-541-8649
E-Mail: ssicomgroup@vanadium.com
Web Site: www.vanadium.com

Thayer Consulting (310) 722-1745
Public Safety Management Consultants
Wireless Voice & Data, IT, CAD/RMS, E911
Strategic Planning, RFPs, Implementation, PM
11718 Barrington Ct. Ste. 320 LA, CA 90049
www.thayerconsulting.com

Towpath Associates
Tel: 518.383.2677 info@towpathassociates.com
www.towpathassociates.com
312 Riverview Rd., Rexford, NY 12148
Public Safety Wireless & E911 Systems Planning, Implementation, Project Management & Problem Solving. ***Finding solutions to difficult organizational problems.***

Trott Communications Group, Inc.
For all your Public Safety Radio Communications Engineering Needs
Walter Jon Stewart, President
4320 N. Beltline Rd. Ste. A100 Irving, TX 75038
(972) 252-9280 - Fax (972) 258-8172
www.trottgroup.com

Tusa Consulting Services, Inc.
19 Augusta Drive, Covington, LA 70435
Ph: 985-892-7348 fax: 985-892-2075
Specializing in Public Safety Radio
www.tusaconsulting.com

DISASTER RESPONSE

Lectures and Presentations: ** Exploring solutions to improve INTEROPERABILITY, in-building coverage, and on-scene and long-range communications * Emergency Mgmt. Planning Communications issues * Product Beta Tester*
Stuart Goldstein M.S. e-mail: stuart867@aol.com
http://hometown.aol.com/stuart867

Advertise in the Professional Directory for as little as $255.00/year.

Contact Terry today:
1-800-548-5536 Ext. 13
tbelair@radioresourcemag.com

FCC LEGAL REPS

Law Offices of Catalano & Plache, PLLC
3221 M Street, N.W.
Washington DC 20007-3616
Representation on FCC Matters/Waivers/ Applications for Commercial & Private Wireless Systems Sales/Assignment & Transfer of Systems
202.338.3200 fax: 202.338.1700

Higgs Law Group, LLC
1028 Brice Road, Rockville, MD 20852
Counseling clients on FCC Licensing, Towers, Enforcement, Contracts, Spectrum Leases, Broker Services, Auctions, 800 MHz rebanding.
www.higgslawgroup.com
Phone: 301-762-8992 fax: 301-762-8993

RF AND GENERAL SAFETY SERVICES

RSI - Radiofrequency Safety International
Complete Telecom Safety Services, University Based Safety Training and Programs. Blended Learning Program, RF Site Assessments.
888.830.5648 www.rsicorp.com info@rsicorp.com

RF Safety Solutions LLC
LIVE, Web-Based RF Safety Training - - Both public and custom courses available.
Ph: 631-698-6765 info@rfsafetysolutions.com
www.rfsafetysolutions.com

TRAINING

Bird Technologies Group - Global Educational Services
Several RF and related courses offered!
Visit us online at www.bird-electronic.com
pvolker@bird-technologies.com 440.519.2050
RF Measurement and Management In Your World!

Proud home of 9-1-1 StarZ
Simulation Training Programs!
www.911trainer.com
Mention Code MC32 & Receive FREE Gift With Order!
Professional Pride Training Company • 1.800.830.8228

SAVE
Solutions In Simulations
Sanders Audio Visual Equipment
866.968.4911 sandersav.com

CALENDAR

April 4-6: UTC Mid-Central Regional Meeting, Lenexa, Kan. United Telecom Council: Alan Johnston, 573-634-2454, ajohnston@cepc.net, www.utc.org

April 4-8: IWCE 2005, Las Vegas. International Wireless Communications Expo, Primedia Business: Renie Fuselier, 800-927-5007, rfuselier@primediabusiness.com, www.iwceconexpo.com

April 13-15: ENTELEC 2005, New Orleans. Energy Telecommunications and Electrical Association: Amanda Prudden, 888-503-8700, amanda@entelec.org, www.entelec.org

April 20-21: UTC Minnesota-Dakotas Regional Meeting, Fergus Falls, Minn. United Telecom Council, Otter Tail Power Company: Steve Rau, 218-739-8618, srau@otpco.com, www.utc.org

April 20-22: MRFAC Spring Meeting, Washington, D.C. Jim Pakla, 800-262-9206, jpakla@mrfac.com, www.mrfac.com

April 21-22: Broadband Wireless World, Las Vegas. Shorecliff Communications: Martin Yamamoto, 949-443-3735, ext. 211, m.yamamoto@scievents.com, www.scievents.com

April 30-May 4: 2005 NASTD Eastern Region Seminar, Burlington, Vt. National Association of Telecommunications Directors: Pam Johnson, 859-244-8184, pjohnson@csg.org, www.nastd.org

May 2-5: ITS America Annual Meeting & Exposition, Phoenix. Intelligent Transportation Society of America: LaShawn Rhoades, 202-484-4847, lrhoades@itsa.org, www.itsa.org

May 4: RCA's 2nd Annual Spring Gathering, Concord, Calif. Radio Club of America: Carolyn Servidio, 800-346-6442, www.radioclubofamerica.org

May 9-13: GTC West 2005, Sacramento, Calif. Government Technology Conference: Lori Ruebel, 916-932-1357, lruebel@govtech.net, www.govtech.net/gtc

May 10-11: Expo Comm Canada Communications, Toronto. Canadian Wireless Telecommunications Association, Reed Exhibitions: Elaine Smith, 888-322-7333, ext. 218, elsmith@reedexpo.com, www.cwta.ca

May 14-17: 2005 NASTD Midwestern Region Seminar, Des Moines, Iowa. National Association of Telecommunications Directors: Pam Johnson, 859-244-8184, pjohnson@csg.org, www.nastd.org

May 22-25: UTC Telecom 2005, Long Beach, Calif. United Telecom Council: Jim Hawarden, 202-827-0300, jim.hawarden@utc.org, www.utc.org

June 4-8: 2005 NASTD Western Region Seminar, Salt Lake City. National Association of Telecommunications Directors: Pam Johnson, 859-244-8184, pjohnson@csg.org, www.nastd.org

June 6-9: Supercomm, Chicago. Telecommunications Industry Association: David Swanston, 888-873-7277, david.swanston@tmp.com, www.supercomm2005.com

June 11-15: 2005 NASTD Southern Region Summer Seminar, Nashville, Tenn. National Association of Telecommunications Directors: Pam Johnson, 859-244-8184, pjohnson@csg.org, www.nastd.org

June 28-July 1: WCA 2005, Washington, D.C. Wireless Communications Association International: Carl Berndtson, 978-371-1792, berndtson@aol.com, www.wcai.com

July 17-20: FCCA, Crystal Bay, Nev. Forestry Conservation Communications Association: Joe Schaefer, 202-624-8474, joe.schaefer@dof.virginia.gov, www.fcca-usa.org

PUBLIC SAFETY EVENTS

April 12: Inaugural Public Safety Communications Leadership in Policy Awards Dinner, Washington, D.C. APCO: 202-833-2700, apco@apco911.org, www.apcointl.org/policyawardsdinner

April 17-20: MoAPCO and North Central 2005 Regional Conference, Kansas City, Mo. Mid-America Regional Council: Robin Tieman, 816-474-4240, robint@marc.org, www.moapco.org

April 25-27: Navigator 2005, Baltimore. National Academies of Emergency Dispatch: Keith Griffiths, 760-632-8280, ext. 204, navigator@emergencydispatch.org, www.emergencydispatch.org

May 2-4: East Coast APCO 2005, Greensboro, N.C. North Carolina APCO: Beth Smith, 336-764-2561, enine11@triad.rr.com, www.apcointl.org

May 22-25: Michigan 9-1-1 Conference, Grand Rapids, Mich. Oakland County Sheriff's Dept.: Christina Russell, 248-858-1645, russellc@co.oakland.mi.us, www.michigannena.org

May 23-27: Annual LEIM Conference, Greensboro, N.C. Law Enforcement Information Management Training, International Association of Chiefs of Police: Southita Saikhamporn, 800-843-4227, saikhamporn@theiacp.org, www.iacptechnology.org

May 25-26: US Law/GovSec/READY, Washington, D.C. National Trade Productions: Wendy Shaver, 703-706-8235, wshaver@ntpshow.com, www.govsecinfo.com

June 1-3: Meeting of the Oregon Chapter of APCO-NENA, Bend, Ore. Carl Simpson, carl@ci.portland.or.us, www.oregonapconena.org

June 6-9: Emergency Communications Educational Summit, Greensboro, N.C. NENA: Michelle W. Jones, 800-332-3911, mjones@nena.org, www.nena.org

June 21-22: Police-Security Expo, Atlantic City, N.J. New Jersey State Association of Chiefs of Police: Miles Watkins, 800-323-1927, www.police-security.com

June 25-29: NSA 2005, Louisville, Ky. National Sheriffs Association: Kimberly Bright, 703-838-5331, kbright@sheriffs.org, www.sheriffs.org

June 25-30: NENA 24th Annual Conference & Trade Show, Long Beach, Calif. NENA: Anna-Marie Batt, 800-332-3911, annamarie@nena.org, www.nena.org

August 21-25: APCO International 71st Annual Conference & Exhibition, Denver. Traci Jones, 888-272-6911, jonest@apco911.org, www.apcointl.org

August 23-27: EMS Expo 2005, New Orleans. Emergency Medical Services: 877-367-3976, expoinfo@earthlink.net, www.emsmagazine.com

August 26-September 2: IMSA, St. Pete Beach, Fla. International Municipal Signal Association: Denise Johnston, 407-665-5598, djohnston@co.seminole.fl.us, www.imsasafety.org

September 11-14: NENA Canada, Windsor, Ontario, Canada. Holly Barkwell-Holland, 905-862-0112, hbholland@fire-monitoring.com, www.nena.org

September 24-28: IACP 2005, Miami. International Association of Chiefs of Police: Chrissy Hart, 703-836-6767, ext. 238, hartc@theiacp.org, www.theiacp.org

For more event information, visit www.mccmag.com

AD INDEX • WEB LINK

To inquire about products advertised in ***MissionCritical Communications***, visit us online at ***www.mccmag.com*** or use the card on **page 155.**

	Pg. #	Reader Circle#
Absopulse www.absopulse.com	68	53
Aeroflex www.aeroflex.com	99	79
Aluma Tower www.alumatower.com	98	77
APCO East Coast www.ncapco.org	115	90
Astron www.astroncorp.com	21	14
Atis Ltd www.atisdigital.com	124	95
Avtec www.avtecinc.com	15	9
Bird Technologies www.bird-technologies.com	51	37
Cadex Electronics www.cadex.com	125	96
Catalyst Communications www.catcomtec.com	69	55
Centurion www.centurion.com	55	41
CES Wireless www.ceswireless.com	63	47
ChargeGuard www.chargeguard.com	34,73	24,57
Cimarron Technologies www.cimtechcorp.com	46	33
Communications Specialists www.com-spec.com	158	99
Connect Systems www.connectsystems.com	53	38
Control Signal www.controlsignal.com	124	94
Cook's Communications www.fleetstat.com	92	72
CPI www.cpicomm.com	69	54
Crescend Technologies www.crescendtech.com	68	52
CVDS www.cvds.com	47	34
Dalman Technical Services www.dalmants.co.uk	80	63
Daniels Electronics www.danelec.com	50	36
Dataradio www.dataradio.com	91	71
Datron World Communications www.dtwc.com	89	70
dbSpectra www.dbspectra.com	80	64
Digital Voice Systems www.dvsinc.com	54	40
Doppler Systems www.dopsys.com	115	
Dynamic Instruments www.dynamicinst.com	18	12
EDX Wireless www.edx.com	72	
EF Johnson www.efjohnson.com	71	56
EMR www.emrcorp.com	66	50
Eventide www.eventide.com	41	29
Exacom www.exacom.com	97	76
Fiplex www.fiplex.com	23	16
Gai-Tronics www.gai-tronics.com	67	51
General Dynamics www.gdds.com	105	82
Genesis Group www.genesisworld.com	106	83
Havis-Shields www.havis.com	108	85
Hutton Communications www.huttononline.com	13	7
ICOM America www.icomamerica.com	5	3
IP MobileNet www.ipmn.com	37	26
IPC Command & Control www.ipc.com	84-85	67
JDI www.jdi-co.com	121	92
Kenwood Communications www.kenwood.net	19	13
M/A-COM www.macom-wireless.com	31	22
Managed Comm Services www.mcs-wireless.com	54	39
McKay Communications www.mckayheadsets.com	76	59
Mercom www.mercom.com	93	74
Microwave Data Systems www.microwavedata.com	38	27
Midian www.midians.com	30	21
Midland Radio www.midlandradio.com	103	81
MissionCritical Communications www.mccmag.com	100	
Mobile Satellite Ventures www.msvlp.com	107	84
Moducom www.moducom.com	2	1
Motorola www.motorola.com/missioncritical	56	42
Multiplier Industries www.multiplier.com	57	43
NABC www.nabcorp.com	75	58
NENA 2005 www.nena.org	128	97
New Communications Solutions www.ncspsc.com	111	86
Northrop Grumman www.northropgrumman.com	49	35
Omnicron www.omnicronelectronics.com	114	89
Omnitronics Pty Ltd www.omnitronics.com.au	64	48
OTTO Communications www.ottoeng.com	35	25
PCTEL Antenna Products www.antenna.pctel.com	117	91
Peltor www.peltor.com	25,27,29	17,19,20
Plant Equipment www.peinc.com	87	69
Positron www.positron911.com	82	66
Pyramid Communications www.pyramidcomm.com	42	30
Q-MAC Electronics www.qmac.com	79	62
RadioSoft www.radiosoft.com	92	73
Raytheon JPS Comm www.jps.com	43	31
Relm Wireless www.relm.com	157	98
RF Industries www.rfneulink.com	58	44
Ritron www.ritron.com	33	23
Sabre Communications www.sabrecom.com	101	80
Satel Oy www.satel.fi	113	87
Savox Communications www.savox.com	86	68
Sierra Technology www.sierratechnology.us	123	93
SoftWright www.softwright.com	98	78
STI-CO www.sti-co.com	22	15
Stone Mountain www.stonemountainltd.com	61	46
Tait North America www.us.taitworld.com	3	2
Telepoint Inc www.telepointinc.com	77,78	60,61
Telewave www.telewave.com	9	5
Telex Vega www.vega-signaling.com	45	32
Tessco www.tessco.com/go/2way	16-17	10
Times Microwave www.timesmicrowave.com	59	45
TPL Communications www.tplcom.com	39	28
Trachte www.trachteusa.com	114	88
Transcrypt International www.transcrypt.com	26	18
Uniross www.uniross.com	65	49
VComm Telecommunications www.vcomm-eng.com	81	65
Vertex Standard www.vertexstandard.com	7	4
W&W Manufacturing www.ww-manufacturing.com	14	8
Wolf Coach/L3 Comm www.wolfcoach.com	95	75
Zetron www.zetron.com	11	6

What Constitutes Harmful Interference?

By Dale Hatfield

Phenomenal growth in wireless communications in recent years — due to the sheer increase in the number of users, the advent of new applications, and users' increased bandwidth requirements — has put severe pressure on the radio spectrum resource. This pressure has led to more intensive use of available spectrum and, in particular, to increased spectrum sharing among different users. In turn, it has increased the potential for interference to incumbent users.

While interference often can be mitigated through various techniques, it cannot be avoided entirely. Each new transmitting device produces some unwanted energy in other receiving systems. Indeed, electrical and electronic devices such as fluorescent lights and computers produce unintended radiation. The only way to guarantee the absence of *any* man-made interference in a receiving system is to ban all other emitters of electromagnetic signals except the desired one. Clearly, this is impractical.

Defining Harmful Interference

While the notion of totally eliminating all man-made interference is unrealistic, harmful interference is another matter. This begs the question: What constitutes harmful interference? The FCC's definition is quite general and provides no quantitative guidance to use in specific circumstances.

One way of approaching the issue of harmful interference — conceptually at least — is to determine the point at which the added economic and other social benefits of a new sharing arrangement, for example, more than offset a decrease in such benefits due to increased interference to existing services.

Before approving a new spectrum-sharing arrangement on a licensed, secondary-use basis or an unlicensed, "underlay" basis, the commission generally adopts a two-pronged approach to dealing with potential interference. First, it works with the parties involved to develop engineering models to predict the interference that will be produced by the new arrangement under various operating conditions. It then uses the models to establish technical and service rules for the new system that it judges will adequately protect existing users against harmful interference.

The second prong of the approach involves enforcement and interference mitigation after the sharing is approved. If interference does occur under the established technical and service rules, the commission requires the secondary or unlicensed user to fix the problem or shut down.

This approach is both aided and complicated by the fact that the actual interference is generated in the receiving system. It can be at least partially alleviated by steps ranging from reorienting an existing antenna; deploying a new, more directive receiving antenna or selective receiver; or, in the longer term, employing more sophisticated interference-canceling techniques.

Interference Mitigation

In the past, the FCC typically has taken a conservative stance both in terms of the engineering models it utilizes and the scenarios it analyzes. It tended to focus on potential worst-case scenarios that were unlikely to occur in practice.

While such a conservative approach might have been justified in the past when engineering models were relatively unsophisticated and there was less pressure on the spectrum resource, going forward it behooves the commission, with the support of industry specialists and researchers, to develop more sophisticated, realistic, and generally less conservative models of interference that better balance economic and social benefits.

Second, the FCC should encourage existing users to deploy more robust receiving systems, especially in instances where the payoff in terms of economic and social benefits from increased sharing is particularly high.

Third, it should encourage voluntary resolution of interference issues through industry and user-led coordination initiatives and the action of marketplace forces where possible.

While interference often can be mitigated through various techniques, it cannot be avoided entirely.

Finally, the commission should deal with low-probability, worst-case scenarios through stepped-up field measurements, more sophisticated harmonization activities, and, where necessary, heightened enforcement activities conducted in conjunction with the industry sectors involved.

The FCC already has taken some steps in this direction. Further steps will take us a long way toward facilitating new and important wireless services while adequately protecting the legitimate needs of incumbent spectrum users, including those with mission-critical applications. ■

Dale N. Hatfield is an independent telecommunications consultant and adjunct professor at the University of Colorado at Boulder and formerly chief of the Office of Engineering and Technology at the FCC. Contact him at dale.hatfield@ieee.org.

This column was inspired by a recent paper by Paul Margie in the Stanford Technology Law Review entitled "Can You Hear Me Now? — Getting Better Reception from the FCC's Spectrum Policy" and by recent collaborations with Hatfield's C.U. colleague , Professor Phil Weiser. However, the opinions expressed are solely Hatfield's responsibility.

Subscription or reader service card missing?
Visit us online at www.mccmag.com.

RadioResource
MissionCritical
COMMUNICATIONS

FAX: 1-888-847-6035

Inquire online: www.mccmag.com

AP05MC

Reader Service

Expires April 2006

After this date please contact supplier directly.

1. Please check the box that best describes your function.

- ❑ A. Corporate Management
- ❑ B. Operations/Administration
- ❑ C. Technical/Engineering
- ❑ D. Sales/Marketing
- ❑ Z. Others Allied to the Field—Please Specify _____

2 Check the box that best describes your organization AT YOUR LOCATION. (Check ONE box)

PUBLIC SAFETY AND GOVERNMENT
- ❑ A. Law Enforcement
- ❑ B. Fire Department
- ❑ C. Emergency Services/PSAPs
- ❑ D. State/Local Government
- ❑ E. Federal Government/Military

BUSINESS/INDUSTRY/TRANSPORTATION
- ❑ F. Public Utility
- ❑ G. Petroleum Industry
- ❑ H. Telecom/Cable/Broadband
- ❑ I. Transportation/Fleet Services
- ❑ J. Other Business/Industry/Field Service

NETWORK SERVICE PROVIDER
- ❑ K. Mobile Radio Operator
- ❑ L. Paging/Messaging Provider
- ❑ M. Cellular/PCS Provider
- ❑ N. Satellite and Other Networks

PROFESSIONAL SERVICE PROVIDER
- ❑ O. Engineering/Consulting Firm
- ❑ P. Wireless Application Service Provider
- ❑ Q. Associations and Other services

PRODUCT DISTRIBUTION
- ❑ R. Manufacturer of Comm. Equip.
- ❑ S. Rep. or Distributor of Comm. Equip.
- ❑ T. Mobile Comm. Dealer/Reseller

❑ Z. **OTHER** allied to field _____

3. Do you specify, recommend or purchase mobile communications equipment or services?
❑ A. Yes ❑ B. No

4. Approx. how many mobile voice and data units does your company use at your location?
❑ A. none ❑ B. 1-10 ❑ C. 11-25 ❑ D. 26-50
❑ E. 51-100 ❑ F. 101-500 ❑ G. 501-1000 ❑ H. over 1000

5. Is there any servicing of mobile equipment at your location? ❑ A. Yes ❑ B. No

6. This inquiry is for: ❑ A. Immediate need ❑ B. Project 6-12 months ❑ C. Project more than 1 year

Name _____

Title _____

Company _____

Address _____

City, State/Province _____

Country _____ **Postal Code** _____

Telephone _____ **E-mail** _____

Circle the numbers which correspond to the products on which you want more information.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114
115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133
134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152
153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171
172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209
210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228
229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247
248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266
267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285
286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304
305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342

RadioResource
MissionCritical
COMMUNICATIONS

P.O. BOX 413050
Naples, FL 34101-3050

A PANDATA PUBLICATION

FIRST CLASS
POSTAGE
REQUIRED

MISSION CRITICAL COMMUNICATIONS
PO BOX 413050
NAPLES FL 34101-3050

Subscription or reader service card missing?
Visit us online at www.mccmag.com.

RP 3000/3600

New portables from RELM/BK.
Twice the value, half the size.

- Built-In Pager & Modem
- Field Programmable
- Voice Storage (RP 3600 Only)
- Emergency ANI Transmission
- 2/5 Tone Encode and Decode
- Power On and Data Password
- LOUD Emergency Siren Alert
- Silent Vibrate Alert
- Wireless Cloning
- Flash Memory
- MIL-STD 810 C/D/E

The Relm/BK RP3000 & RP3600 are compact, feature-rich portable radios with ultra-clear reception and rugged diecast aluminum chassis. Each offers reliable communications in public safety, government service or property management. Call us at 800-821-2900 and get more bang for your buck with these and other new cutting-edge RELM/BK products.

RP3000
16 Channels

RP3600
128 Channels

RELM/BK

800.821.2900 www.relm.com

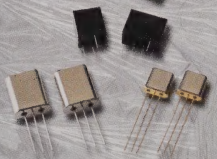
See Us at IWCE CIRCLE #98

COMMUNICATIONS SPECIALISTS, INC.

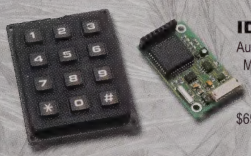
LEADING THE WORLD IN ADD-ON TONE SIGNALING PRODUCTS FOR OVER 30 YEARS

- One Year Warranty on all products
- Order Factory Direct – No Minimums
- Same day shipping on most orders
- Toll free voice and fax for easy ordering
- 24 hour "InfoFax" and website application notes for around-the-clock tech support

DCS-23
Digital Coded Squelch Encoder-Decoder
Jumper Programmable to all 106 DCS codes.
1.36" x 1.18" x 0.25"
$59.95

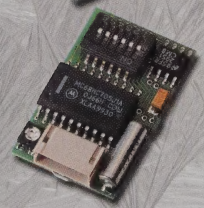


FILTERS
Call us for the lowest cost, 12.5kHz channel spacing, exact replacement crystal and ceramic IF filters for part 90 Refarming. Complete kits available for most popular radios at $15.00 to $25.00/kit.



ID-8
Automatic Morse Station Identifier
Meets all FCC ID requirements.
Fully field programmable with included keypad.
1.85" x 1.12" x .35"
$69.95

PE-1000
Desktop Paging Encoder
Two-Tone Sequential.
Other formats and custom tones available.
7.5" x 7.8" x 2.7"
$224.95



SS-64
CTCSS Encoder
Microminiature, DIP switch programmable.
Includes 64 tones from 33.0 to 254.1 Hz.
0.66" x 1.08" x 0.21"
$28.95

TE-32
Multi-tone CTCSS Encoder
Rotary dial switchable to any of the standard 32 EIA tones.
5.25" x 3.3" x 1.7"
$49.94
TE-32D with LED display, $99.95

TP-3200
Shared Repeater Tone Panel
Full featured and with all 157 CTCSS/DCS codes.
Desktop and rack mounted versions.
$279.95

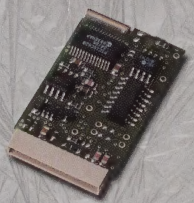
TS-64
CTCSS Encoder-Decoder
Microminiature jumper programmable.
Includes 64 tones from 33.0 to 254.1 Hz.
0.78" x 1.70" x 0.25"
$54.95 (model TS-64DS with DIP switch, $57.95)

NOW MORE THAN EVER, YOUR BEST SOURCE FOR QUALITY TONE SIGNALING PRODUCTS!

WE'RE PLEASED TO ANNOUNCE THE ACQUISITION OF THE

Selectone

LINE OF TONE SIGNALING AND ENCRYPTION PRODUCTS, TO BETTER FULFILL YOUR TONE SIGNALING REQUIREMENTS.



ST-20, 25, 50
Voice Encryption Units
PRIVATE COLLECTION™ series provides low to high level security for two-way radio voice applications.
PC programmable with optional kit.
0.9" x 1.5" x 0.25"
$79.00 - $299.00

ST-804A
Multi Format Encoder
Encodes Two-Tone Sequential, Burst Tone, or DTMF ANI/ENI Formats.
PC programmable with optional kit, or factory programmed for free.
1.15" x 0.84 x 0.15"
$59.95

ST-809B
Multi Output DTMF Decoder
Decodes address codes of 1 to 7 digits from all 16 DTMF characters.
Multiple outputs and remote reset capability.
PC programmable with optional kit, or factory programmable for free.
1.34" x 0.85" x 0.21"
$59.95

ST-888
Desktop ANI Decoder / Display Unit
Use with ST-804A or other DTMF ANI encoders for monitoring of fleet radio users and control systems.
$499.00

COMMUNICATIONS SPECIALISTS, INC.
426 WEST TAFT AVENUE • ORANGE, CA 92865-4296
(714) 998-3021 • FAX (714) 974-3420
ENTIRE U.S.A. (800) 854-0547 • FAX (800) 850-0547
http://www.com-spec.com

CIRCLE #99